U.S. DEPARTMENT OF COMMERCE
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PB-296 550

Institutional Aspects of Wastewater Management The Boston Case Study

Urban Systems Research and Engineering, Inc, Cambridge, MA

Prepared for

National Science Foundation, Washington, DC

1 Jan 79

BIBLIOGRAPHIC DATA SHEET

1. Report No. NSF/PRA-CEQ7AC015

2.

3. Recipient's Accession No. PB296550

4. Title and Subtitle
Institutional Aspects of Wastewater Management: The Boston Case Study

5. Report Date
January 1, 1979

6.

7. Author(s) James F. Hudson, Sarah Weinstein, Patricia S. Deese, Bert Collins and Carol Madsen

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Urban Systems Research & Engineering, Inc.
36 Boylston St
Cambridge, Massachusetts 02138

10. Project/Task/Work Unit No.

11. Contract/Grant No.
EQ 7AC015

12. Sponsoring Organization Name and Address
Council on Environmental Quality
722 Jackson Place, N. W.
Washington, D. C. 20006

13. Type of Report & Period Covered
Final

14.

15. Supplementary Notes The other reports are: Wastewater Treatment Facilities Planning in the Boston Metropolitan Area; Water Quality Goals, Objectives, and Alternatives in the Boston Metropolitan Area; Sludge Management Planning in the Boston Metropolitan Area.

16. Abstracts One of four contractor reports compromising a Federally-sponsored study, "Scientific and Technical Evaluation of the Environmental Protection Agency's Wastewater Treatment Facilities Grants Planning Process-Boston Case Study." The objective of the study was to examine recent operation of EPA's Construction Grants Program, using the Boston Metropolitan Area as a case study, with a view toward developing recommendations for possible actions at the national level. This report analyses the planning and institutional aspects of wastewater management in the Boston Metropolitan Area. This report addresses five institutional and political aspects of the water pollution control program: financing of the local portions of system costs; policy guidance issued by the Federal government; coordination among programs operations, management, and maintenance of programs and facilities; and public participation in the planning processes. There are two types of recommendations: those which increase the considerations of comprehensive planning issues, and those which increase local flexibility in the implementation of facilities and controls.

17. Key Words and Document Analysis. 17a. Descriptors

Waste water
Water pollution
Water quality
Water resources
Water treatment
Waste treatment
Environmental engineering
Sewage
Sewage treatment
Project planning
Contract administration
Facilities management
Management planning
Benefit-Cost analysis

17b. Identifiers/Open-Ended Terms

Comprehensive planning
Institutional planning structure
Institutional coordination
Facility planning
Public participation
Construction planning
Federal Water Pollution Control Act of 1972
Clean Water Act of 1977
Boston Harbor
Grants Management

17c. COSATI Field/Group 5A, 5D, 13B, 14A

18. Availability Statement
UNLIMITED

19. Security Class (This Report)
UNCLASSIFIED

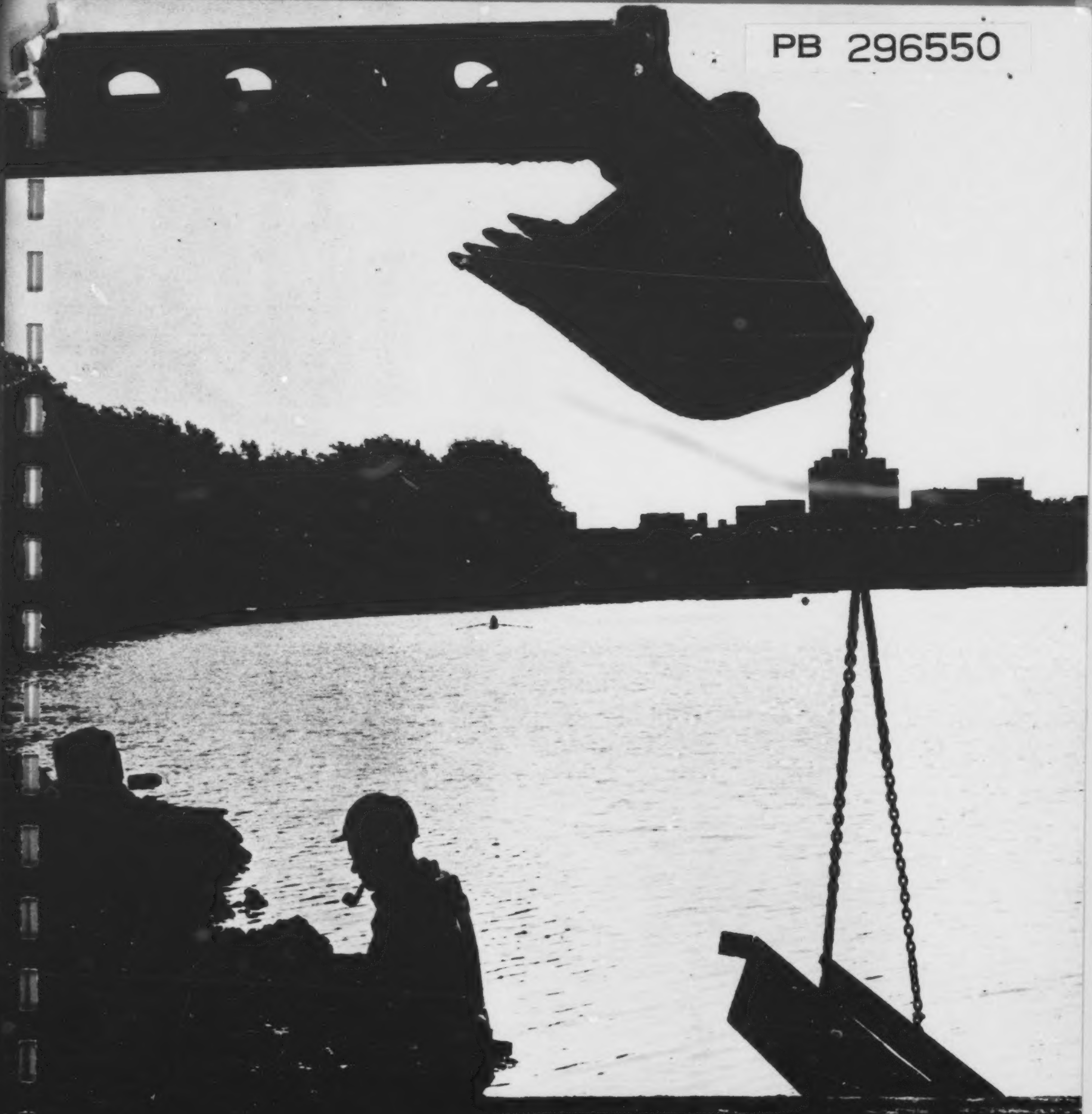
2 367

20. Security Class (This Page
UNCLASSIFIED

22. Price PCA16 / MF A01

FORM NTIS-35 (REV. 10-73) ENDORSED BY ANSI AND UNESCO. THIS FORM MAY BE REPRODUCED USCOMM-DC 8265-P74

PB 296550



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Urban Systems Research and Engineering, Inc

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INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

INSTITUTIONAL ASPECTS OF WASTEWATER MANAGEMENT

THE BOSTON CASE STUDY

Final Report

January 1, 1979

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Council on Environmental Quality
National Science Foundation
Environmental Protection Agency
Office of Management and Budget

Under Contract No. EQ7AC015 to the Council on Environmental Quality
722 Jackson Place, N.W., Washington, D.C.

TABLE OF CONTENTS

Page
Disclaimer v

Acknowledgements vi

Chapter 1 Executive Summary 1

Chapter 2 Introduction 16

2.1 Wastewater Management in the Boston Area 17
2.2 The Wastewater Planning Process 22
2.3 Major Areas of Interest 25
2.4 Methodology and Limitations 26
2.5 Structure of the Report 28

Chapter 3 Comprehensive Planning for Clean Water 29

3.1 Water Resource Planning 32
3.2 Coordinating Plans at the Local Level 40
3.3 Conclusions and Recommendations 43

Chapter 4 Regional Wastewater Management Planning 45

4.1 The Influence of Federal Actions on Regional Planning in Boston. 48
4.2 Coordination of New and On-Going Areawide Planning 56
4.3 Areawide Planning and the Public 59
4.4 Regional Planning and Local Plans 64
4.5 Conclusions and Recommendations 74

Chapter 5 Facility Planning, Design, and Construction 76

5.1 Initiation of Construction Grants: The Role of Enforcement . . 78
5.2 Planning and the Choice of Technologies 82
5.3 Provisions for Quality Control and Design Review 92
5.4 Conclusions and Recommendations. 93

Chapter 6 Impact Assessment and Presentation 99

6.1 The Environmental Impact Assessment Process 102
6.2 Evaluation of Economic Impacts 108
6.3 Conclusions and Recommendations 127

Page

Chapter 7 Operations and Maintenance 130

7.1 The Role of EPA and the Commonwealth in Plant Operations 130
7.2 Impact of Financing Procedures on the MSD and Other Districts . . 136
7.3 Long-Term Plant Maintenance 141
7.4 Conclusions and Recommendations 143

Chapter 8 Overall Planning and Institutional Issues 144

8.1 Consideration of Program Impacts 144
8.2 Public Participation Throughout the Process 147
8.3 The Roles of Various Participants 149
8.4 Conclusions 152
8.5 Recommendations 153

Appendix A List of Interviews 155

Appendix B The Boston Case Study 160

Appendix C Glossary of Acronyms Used 190

Appendix D Methods of Financial Analysis 193

Appendix E Public Comments and USR&E Responses 197

TABLES AND FIGURES

Page

1.1 Wastewater Management Process 3

1.2 Wastewater Management Areas 4

2.1 The Study Area 18

2.2 Executive Office of Environmental Affairs 20

2.3 Wastewater Management Process 23

3.1 Water Resources and Wastewater Coordination 30

3.2 Overview of SENE Recommendations 33

4.1 Mandated Regional Planning Relationships 46

4.2 Actual Regional Planning Relationships 49

4.3 Areawide Water Quality Management Planning Elements 51

4.4 Facilities Needs Identified by DWPC 66

4.5 Massachusetts Clean Water Program Step 1 Construction Grants Awarded FY 1975-1977. 67

4.5a Massachusetts Clean Water Program Step 2 Construction Grants Awarded FY 1975-1977. 68

4.6 Massachusetts Clean Water Program Step 3 Construction Grants Awarded FY 1975-1977. 69

4.7 Grants Made to Communities, FY 1974 to FY 1977 70

5.1 Schematic Flow Diagram Construction Grants Program 77

6.1 Impact Assessment Process 101

6.2 Current MDC Financing Procedures 112

6.3 Annual Costs of MDC Services to Member Communities Under the EMMA Plan 115

6.4 Impacts of Industrial Cost Recovery 116

6.5 Magnitude of Capital Costs for EMMA 117

6.6 Effects of Inflation 120

6.7 Effects of Relative Inflation on Costs 121

6.8 Effects of Varying Discount Rates 122

6.9 Impact of Local Construction Expenditures 124

6.10 Local Cost in Current Dollars 125

6.11 Impact of Costs on Communities, 1985 126

7.1 Federal and State Supervision of Municipal Operations and Maintenance . 131
8.1 Wastewater Management Process 145
B-1 River Basins in the Study Area 161
B-2 EMMA Classification of Communities 162
B-3 Office of State Planning Community Classification 163
B-4 Census Area Definitions 165
B-5 Wastewater Management Areas 166
B-6 Communities in MAPC, Not Represented in 208 Project 167
B-7 Communities Proposed for Inclusion in MSD 167
B-8 Existing and Proposed MDC System 168
B-9 Metropolitan District Commission 172
B-10 Executive Office of Environmental Affairs, Boston, Massachusetts . . . 178
B-11 Environmental Protection Agency, Region I 186

DISCLAIMER

This report has been reviewed by the Interagency Study Team for the Boston Case Study, and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Council on Environmental Quality, the National Science Foundation, the Environmental Protection Agency, or the Office of Management and Budget.

ACKNOWLEDGEMENTS

This report could not have been prepared without the cooperation and support of the people concerned with wastewater management in the Boston metropolitan area. Their willingness to participate in interviews, and to provide the project staff with reports, publications, and internal documents has made the project possible.

We have also received support from a number of reviewers, including the members of the Interagency Study Team, and USR&E staff and consultants including Clark Binkley, Richard Tabors, and Michael Alford. The comments received from these sources have been of great assistance, though we must, of course, take full responsibility for all results contained here.

Our final acknowledgement is to Ellen Kane who has made it possible for us to effectively keep track of the data in the interviews and documents, and organized the preparation and revision of this report.

APR 1979

ABOUT THIS REPORT

The attached is one of a group of four contractor-prepared reports which collectively comprise Phase II of a government-sponsored study, "Scientific and Technical Evaluation of the Environmental Protection Agency's Wastewater Treatment Facilities Grants Planning Process - Boston Case Study." The study examines current administration of the municipal wastewater treatment facilities construction grants program established by the Federal Water Pollution Control Act Amendments of 1972 and modified by the Clean Water Act of 1977.

The reports were prepared for a federal interagency study team composed of representatives of the National Science Foundation, the President's Council on Environmental Quality, the Office of Management and Budget, and the Environmental Protection Agency headquarters. Draft copies of these reports were made available to the public in August 1978 and were the subject of agency and public meetings in September 1978. Written comments were solicited from governmental agencies, public interest groups, and the general public. They are noted and responded to by the contractors in the final printed reports.

The objective of the study was to examine recent operation of the Construction Grants Program, using the Boston Metropolitan Area as a case study, with a view toward developing recommendations for possible legislative or administrative actions at the national level to (1) improve the administration of the program in general; (2) upgrade the scientific and technical basis for decisionmaking; and (3) assure that federal funds are used in a cost effective way to achieve national water pollution cleanup goals.

The four reports comprising Phase II of this study are

Kennedy Engineers, Inc., Wastewater Treatment Facilities Planning in the Boston Metropolitan Area - A Case Study. Engineering Report. January 1979.

Environmental Research & Technology, Inc., Water Quality Goals, Objectives, and Alternatives in the Boston Metropolitan Area - A Case Study. February 1979.

Environmental Research & Technology, Inc., Sludge Management Planning in the Boston Metropolitan Area - A Case Study. January 1979.

Urban Systems Research & Engineering, Inc., Institutional Aspects of Wastewater Management: The Boston Case Study. January 1979.

Our signatures indicate that this study was conducted under our supervision, but they do not imply our agreement, individually or collectively, with the study findings, conclusions, or recommendations.

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CHAPTER 1

EXECUTIVE SUMMARY

This report analyzes the planning and institutional aspects of wastewater management in the Boston Metropolitan Area. It does this for a specific purpose: to suggest ways in which Federal programs for water pollution control can be improved. Analysis of the actual operations of the program in a case study area like Boston can bring an increased sense of reality to national policy deliberations. This has been the reason for the entire Interagency case study.

This project addresses five institiitional and political aspects of the water pollution control program:

- financing of the local portions of system costs;
- policy guidance issued by the Federal government;
- coordination among programs undertaken by various governments, and private firms or associations;
- operations, management, and maintenance of programs and facilities;
- public participation in the planning process.

In looking at Boston, our observations have been limited to those areas where Federal policies have affected the planning process. The Clean Water program imposes numerous requirements on state, regional, and local governments; it also provides many opportunities to develop needed programs and facilities, primarily through Construction Grants. We have been concerned with the overall impact of all these requirements and opportunities on the Boston area, and with the reactions of various local institutions to them. We have observed the program through interviews, review of documents, and some quantitative analysis of our own; we have also attempted to use these observations to find ways in which the Federal programs could be improved, to the benefit of the nation, and particularly to the benefit of the Boston area.

As with any case study, our analysis is limited. Observations in Boston alone may not be sufficient to prove that changes in the program would be desirable, and our conclusions should probably be confirmed elsewhere before changes are contemplated. We believe, however, that our observations are accurate, and that our recommendations would lead to significant improvements in the area, if they were implemented by the Federal government. Please note that data collection was completed as of January 31, 1978, and the report does not reflect changes after then, except through a few updating footnotes.

As envisioned by Congress, the water pollution control program developed under P.L. 92-500* involves a series of connected stages of planning and implementation, as shown in Figure 1-1. This nominal process forms the basis for the presentation of our results: we attempt to show where the actual process differs from the nominal one, either in spirit or in operation. We can identify ways in which the actual process may not meet the goals envisioned by Congress, and suggest recommendations which will make things better.

Chapter 2 of this report defines the nominal wastewater management planning process, and the relevant institutions participating in it in the Boston area. Chapter 3 then covers the "Master Planning" and "Water Resources Planning" steps, which chapter 4 looks at "Areawide Planning" for river basins and for metropolitan areas. Chapter 5 analyzes "Facilities Planning" and "Design," and chapter 6 covers the "Impact Assessment" steps. The focus of chapter 7 is on "Operations, Monitoring, and Enforcement," and chapter 8 considers some special issues of overall concern, such as public participation, and the balance between the various steps of the planning process. Each of these chapters is described briefly in the remainder of this summary, along with its major conclusions and recommendations.

Chapter 2: Introduction

Figure 1-2 shows the study area, along with the boundaries of the most significant wastewater management districts. The institutions of interest include:

EPA, particularly the Region I office, which has both guidance and operational responsibilities for the Construction Grants and NPDES programs, and responsibility for impact assessment.

The Massachusetts Executive Office of Environmental Affairs, whose responsibilities include Environmental Impact Review, permits for wetlands, septage, and sludge disposal and on-site systems.

The Division of Water Pollution Control, which is the state operating agency for construction grants and NPDES, and for the basin plans and related portions of the Continuing Planning Process.

The Metropolitan District Commission (MDC), which is a state agency, but is also the regional sewage wholesaler serving 43 communities in the Boston area.

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*The Federal Water Pollution Control Act Amendments of 1972; see Appendix D for a glossary of acronyms used in the report.

Figure 1-1

Wastewater Management Process

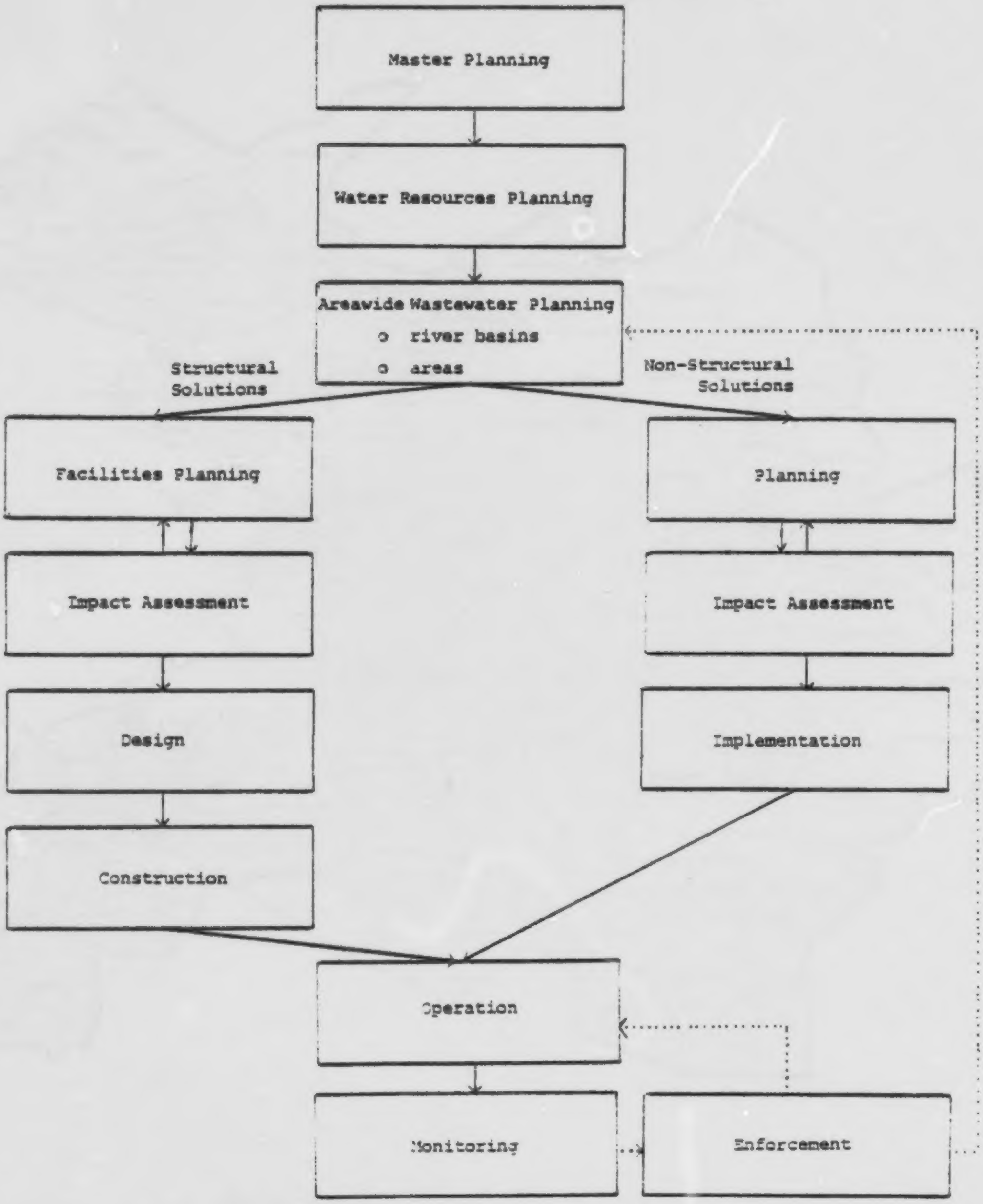
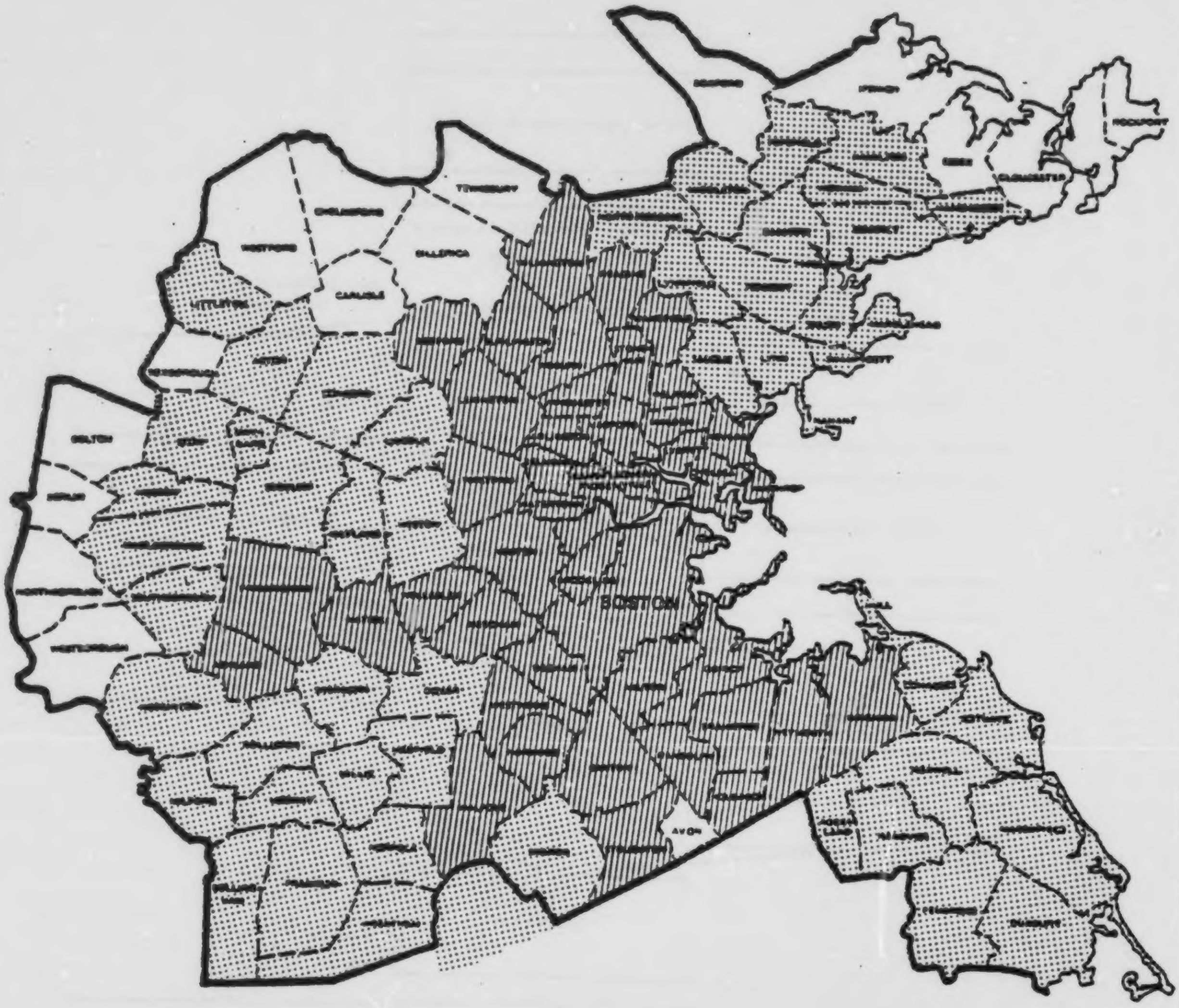

Master Planning
Water Resources Planning
Areawide Wastewater Planning
o river basins
o areas
Structural Solutions
Non-Structural Solutions
Facilities Planning
Planning
Impact Assessment
Impact Assessment
Design
Implementation
Construction
Operation
Monitoring
Enforcement

Figure 1-2

Wastewater Management Areas


TEWKSBURY
CHELMSFORD
WESTFORD
BILLERICA
CARLISLE
LITTLETON
BOLTON
ESSEX
GLOUCESTER
ROCKPORT
BOSTON
AVON

▨ Metropolitan Sewer District

░ Other Communities in 208 Project Area

Full Area was used for the EMMA Study.

The Metropolitan Area Planning Council (MAPC), which received the Areawide planning grant under Section 208 of P.L. 92-500.

About 100 cities and towns, who are (with the MDC and other sewer districts) potential recipients of construction grants in the Boston Metropolitan area and owners and operators of all collector sewers, some interceptors and some treatment facilities.

The MDC sewer district and planning area, and the cities and towns, are shown in Figure 1-2; the overall area shown on the map, which was used for the MDC's "EMMA" study, covers about 1600 square miles, and includes over three million people.

Chapter 3: Comprehensive Planning for Clean Water

The Comprehensive Planning Process, as required under P.L. 92-500, involves the development of "Level B" studies for each major basin in the country. In the Boston area, the "Level B" study is known as SENE, for the Southeastern New England area it covers. SENE has been supplemented by two other studies concerned with water supply and growth policy in the Commonwealth. The goals of comprehensive and coordinated planning are also aided by the A-95 review process, and by other methods of coordinating local projects.

SENE developed a large number of recommendations for the region, in areas such as water supply, water quality, growth management, recreation, flooding, the coastal zone, and facility location. It developed these recommendations through an extensive program of analysis and public participation. However, the process seemed to stop with report publication: implementation of the recommendations has been slow and fragmented. A few of the recommendations have been taken up by proponents in other agencies, but most have not. The concerns of SENE have only entered the later stages of the planning process where agencies further down the line have had an incentive to use them.

Implementation appears more likely for the results of the Massachusetts Water Supply Policy Study, partially because its focus was more narrow. Water supply is a growing concern in the state, and may be one vehicle for more comprehensive planning, at least for wastewater facilities. However, the same does not appear to be true for the Massachusetts Growth Policy report: this was an ambitious effort at town participation in state policy formulation, but there is little evidence of implementation to date.

The A-95 process is intended to provide comprehensive review of all uses at individual sites. In actual operation, it appears that wastewater projects are reviewed only by a few outside agencies, while wastewater management agencies seldom review other types of projects. Thus, the A-95 review does not directly lead to consistency of assumptions across planning projects, though it may aid in the review of individual project impacts on other programs, as intended.

Even with the limitations of A-95, however, the necessary types of coordination for development of different types of faciltiies on a single site appear to occur, and the facilities are reviewed by the various interested parties. The mechanisms through which this happens are varied and often unreproducible: they have involved court action, actual comprehensive planning, public participation efforts, and the EIS process in various cases in the study area. Whatever the route, though, the necessary coordination does seem to occur.

Conclusions: We believe that SENE and similar efforts are extremely valuable for goal-setting and the formulation of overall policies, but we see little evidence that these policies, however desirable, are implemented later on. Thus, it appears that the water resources planning process is, in general, limited: it is only when there is specific agency interest in implementation (as with the Massachusetts water supply planning) that progress can be made, and sometimes even that is not enough. On the local level, the designated A-95 process does not seem to be effective in coordination, except when a project is already known to be controversial; however, the coordination does happen, through various case-specific mechanisms, and A-95 may be a supportive force.

Recommendations: "Level B" studies should be continued as required by Section 209 and every attempt should be made to aid implementation of their recommendations. EPA has numerous requirements for the implementation of 208 plans (see below): the agency could require consistency between these plans and the "Level B" studies which would aid the 208 process and other forms of planning. Goal formulation and large-scale planning are useful parts of the overall process, and should be encouraged.

At the local level, coordination seems to occur through numerous channels and we see no need to recommend changes in a working process: A-95 and the other approaches should remain.

Chapter 4: Regional Wastewater Management Planning

The Continuing Planning Process under section 303 (particularly the Basin Plans under 303e) and the areawide planning required under section 208 bring a number of regional considerations into the planning process. For example, under 303e the state is supposed to classify streams for desired water quality, and the Basin Plans are then to develop wasteload allocations for point and nonpoint sources. The 208 plan, when implemented, is supposed to describe the necessary facilities and non-structural controls for the area, after consideration of point and nonpoint sources and local economic, demographic, and land use issues.

In Massachusetts, the 303e plans are prepared by the Division of Water Pollution Control, while the MAPC is responsible for the 208 plan for the Boston area. There is another important plan as well: the MDC has developed its own regional sewerage plan (known as EMMA) which has been used as both the Boston Harbor Basin Plan and as the 208 point source plan for most of the metropolitan area.

The problems of 208 planning have been enormous. The program's funding was delayed, and by the time it was released most of the communities in the area had initiated independent facilities planning projects outside of its control. Guidance was slow to develop, with major directives arriving particularly late in the schedule with some differences between EPA national and regional directives. Miscellaneous program requirements were a burden: EPA asked for detailed analysis on numerous factors and was late in providing adequate guidance on how to do it. There has also been a strong emphasis on implementation, even during the first two years of 208 planning.

The 208 project has focused on the easiest problems -- primarily facility planning and sewer needs analysis for its member communities, with some work on generic nonstructural or stormwater abatement approaches. It has used secondary data which was not always accurate, and initially advocated conventional structural approaches for existing problem areas. The Preliminary Basin Reports, therefore, were primarily a compendium of sewer plans based on limited local data.*

The first round of 303e Basin Plans was prepared with delays of six months to two years, and these plans are inconsistent and incomplete. Revisions are expected to include 208 project results, primarily for non-point sources. In the Boston area, EMMA was accepted as the 303e plan even though it only partially meets the requirements. Because of its use by the 208 project, EMMA and additional data developed for the EIS will also be a major data source for the updating.

Conclusions: Two conclusions are apparent with respect to 208 planning. First, the project has been required to do many things, and could not do all of them very well. Many of the requirements have been determined by EPA, and they fragmented the planning process, and required numerous shifts in emphasis over time.

Second, the focus of the 208 project on structural solutions through most of its life is disappointing. Under the initial agreement to accept EMMA, the project lost any opportunity to propose nonstructural options as alternatives to structural solutions through much of the study area; even when it had the opportunity, however, it concentrated on structural options, with some attempts to develop generic nonstructural solutions, but little comparative analysis for particular sites.

The Basin Plans for the area have not yet been effective in setting wasteloads on facility priorities, or including the effects of non-point sources. This is expected to continue, at least for Boston Harbor.

Recommendations: We feel strongly that the 208 project has not concentrated on the most significant areas, but instead on the easy aspects of areawide planning. In particular, the concern with "implementation" has led to a focus on local structural solutions; the 208 plans should have had (and should have) a chance to address the long-range and areawide issues such as growth management, water supply, urban runoff control (for more than single communities), and non-point sources of other types. We recommend that 208 planning be continued, but directed at these issues, not at control over established facilities plans. At the same time, we recommend that EPA support town initiatives to develop nonstructural controls in the same way that it supports facilities plans: with grants to do the planning.** In hindsight, the "Level B" plan could have set the major goals, with individual studies funded by EPA to focus on specific areawide and nonstructural issues under Section 208. We believe that specific projects with limited goals and well-defined products would lead to more implementation than the 208 activities studied.

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*These reports were subject to local comment and were revised considerably, outside the study period, with major modifications made in the proposed solutions for several communities.

**This may happen under the revised 201 Facilities Planning regulations.

Our recommendation with respect to Basin Planning is simpler: we believe that real Basin Plans, as described in the EPA Regulations, and with all the required information, should be prepared for Basins in the study area. As will be seen below, the Construction Grants program operates independently of the processes intended to lead to improved water quality; complete Basin Plans have the greatest chance of closing this gap.

Chapter 5: Facility Planning, Design, and Construction

The Construction Grants Program is the largest public works program in the nation, and one of the most significant parts of the water pollution control effort. In the nominal process, communities with needs for pollution abatement come to EPA and the states for help, and receive assistance in planning, designing, and building the necessary facilities. Certain regulations are imposed for consistency and quality control, and to minimize the required Federal expenditure, but (in theory) the community initiates the process and complies with the regulations because it desires the grants.

In fact, EPA and DWPC initiate the process, usually through enforcement of NPDES permits: communities are required to comply with their permit conditions. Since the only options available to the communities are to build with Federal funds or to build without them, the cities and towns apply for construction grants. At this point, however, the enforcement effort seems to stop: as long as the community appears to be making some progress towards receiving its grant, enforcement is not continued. The NPDES enforcement is used to provide an incentive for grant application, rather than as a direct incentive for communities to meet their permit conditions.

EPA and DWPC both impose many requirements on the grantees: in EPA's case, these requirements include various forms of analysis (e.g., cost-effectiveness), economic limits on how communities must pay for the facilities, and a host of other regulations.* EPA is also involved in review of facilities plans and in inspections of facilities under construction and does a very limited amount of design review.

For most of the facilities in the Commonwealth, the role of DWPC is even more significant. The Division develops the priority list each year, based on its own professional judgment and the Municipal Facilities Inventory: the priority list then determines which facilities are funded. The Division also provides guidance in the selection of alternatives, including some strict limits on the consideration of devices such as septic tanks.** Its ability to effectively review innovative systems is limited, and it requires more detailed documentation of them than it does for conventional systems. Regionalization is also a continuing goal of DWPC, and it requires that regional alternatives be considered, even when the towns are opposed to regional solutions. However, DWPC does not perform detailed review of designs for the majority of systems, because of limits on resources.

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*Recently significantly revised to reflect P.L. 95-217: see 43 FR 44022FF.

**Recent revisions in the priority list criteria may change this focus.

A few communities have been extremely active, suggesting alternatives, closely reviewing the work of their consultants, and attempting to get approval for their chosen alternative from EPA and DWPC. Most, however, have been willing to accept conventional systems as designed, with little show of local interest.

Conclusions: At this point, the process is controlled largely by DWPC, and to a lesser extent by EPA, in their attempt to bring all systems up to the required effluent quality. They determine which plants are necessary, whether they can be funded in particular years, and whether the proposed technology is acceptable. This is done with only limited consideration of the actual water quality impacts of the proposed systems, and limited involvement of the Basin Planning process.

The communities are beginning to have more options, particularly in technology selection, where some unconventional systems are being proposed. However, the cost-effectiveness requirement on EPA funding limits the ability of communities to choose the system they desire, and get EPA support in building it.*

With respect to quality control, there is no independent review of plans and designs for their detailed assumptions and projected cost and performance, aside from internal quality control in the consultant firms, which is voluntary.

Recommendations: One major recommendation is that the alternative selection and funding decisions be separated, to allow communities to choose the system most attractive to them. As the process currently works, communities can either select the most nationally cost-effective option, and receive a grant; or, they can select some other option, which might be less expensive for them and receive no support from EPA. We recommend that the grant be determined according to whichever alternative is most cost-effective nationally, but that the community then be allowed to apply this grant to an option preferred locally, as long as EPA and DWPC are convinced that the system will perform the required pollution abatement. This approach might later be expanded to allow them to build any preferred alternative if the situation warrants.

With respect to the requirement that the systems solve the pollution problem we see two options. One is a performance control, and is currently in force: if the plant does not achieve the necessary effluent quality, the final grant payment is withheld. However, we also believe that EPA and DWPC should assist the communities in evaluating alternatives at an earlier stage. Since the DWPC cannot hope to be expert in all innovative technologies, we recommend that they contract out review, or obtain training, where necessary, so that the extra burdens of required knowledge for innovative approaches are not placed totally on the grantee, but rather assumed by the granting agency.

We recommend that the state priority list be directly tied to the Basin Plans. While these plans are not technically sophisticated as yet, the priority list should reflect the water quality concerns which are supposed to be considered in the Basin Plans. Professional judgment is likely to remain an important part of setting priorities, but this judgment should reflect the water quality goals of the area more directly than it does now.

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*Again, this is apparently changing.

Finally, we see major problems in the quality control of facilities plans and designs, and have a number of suggestions for improving the designs of future systems.

- Independent review of designs should be implemented for small projects (where local expertise is most lacking) as well as for the large ones, where EPA already requires "Value Engineering."
- DWPC should assist communities in the review of consultant qualifications and selection of consultants, if legally possible. At the very least, more guidance on desirable qualifications could be provided.
- A portion of the consultant's fee should be withheld until the plant passes final inspection, so that both the consultant and the community will have an interest in the operation of the plant.
- EPA's power to intervene in community suits against design engineers should be reserved for clear-cut cases. To make this possible, preventive measures should be emphasized, so that the need for after-the-fact suits is minimized.
- The Division and EPA should make it clear to communities where the responsibility lies: at present, many cities and towns believe that EPA and DWPC approval of designs means that there are no errors, and they should be informed that this approval involves only a very limited review. EPA and DWPC should provide funding for more extensive review, where the communities request it: this might involve "Value Engineering," as suggested above, but other approaches should be possible.

Chapter 6: Impact Assessment and Presentation

This chapter analyzes the assessment of environmental and economic impacts in the study area, and also presents some estimates of economic burden which were developed as part of this study. The process here is very simple: each step 1 plan and the 208 plan must prepare assessments of the expected environmental impacts of the proposal, and step 1 plans must also analyze the cost-effectiveness of the various alternatives. Where necessary, EPA then determines that an Environmental Impact Statement is required and prepares it.

In the Boston area, the actual process has followed this framework in a straightforward manner, though the effects of EIS preparation and cost-effectiveness analysis have been more complex. For example, three Environmental Impact Statements have been (or are being) prepared: one on Primary Sludge Management, one on proposed New and Upgraded MDC Treatment Plants, and one on the 208 plan.* In the first two statements, the EIS process has led to significant changes in the alternatives considered, and may affect the chosen alternative as well. The MDC, which will have to implement the facilities, has not been involved in the EIS process as a major participant; instead, the EISs are being prepared by EPA with little direct MDC involvement. The Treatment Plants EIS is particularly interesting, since EPA chose to prepare it in advance of step 1 planning, using EMMA as a base; the MDC is to perform its planning using the alternative chosen by the EIS which is, in essence, doing facility planning. The alternatives considered by EPA are directed at facility location, and are much more limited than those considered in EMMA: for example, ocean discharge and land application are not being analyzed in depth.

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*The latter two EIS's have been issued in draft form since the data collection for this report ended.

The presentation of economic impacts for the proposed facilities seems to excite little public reaction. The MDC, for example, revised its financial allocation system a few years ago, with little interest shown by communities who were affected by changes in their annual assessments. Costs presented in step 1 planning have been generally viewed as only one impact. They can be used in negotiations which attempt to revise the alternatives, but they are not of paramount importance. This reaction has been shown consistently, even though the costs for MDC service are expected to double (in constant dollars) between now and 1985, under the proposed construction schedule. In current dollars, the costs in 1985 are expected to be over $70/household in 1985, and over $90/household in the year 2000, compared to $23 now.

According to our analysis, Industrial Cost Recovery charges should be about 10¢/1000 gallons in 1985 (using constant 1975 dollars), which will be about a 15% increase in cost to industries discharging over 25,000 gallons per day, if ICR is implemented.

If the construction schedule is followed, the MDC will require significantly more than the total state allocation in 1982 and 1983 (required grants each year of about $300 million, with a state allocation of about $140 million). This is expected to lead to a modified construction schedule; however, the MDC will require about 70% of the total available construction grants funding for the 1978-1985 period.

Conclusions: EPA has used the EIS process primarily for facilities planning, concentrating on implementation issues such as detailed site location, rather than major system alternatives. The EIS process seems to limit the MDC to the alternative selected by EPA, which will be the only grant eligible option.

Costs for the system are not expected to reach 1% of the median income, except in a few suburban communities which are expanding their collection networks. ICR costs are also not expected to be high. However, MDC system cost per household will double under the proposed system (in constant dollars), and will rise even more sharply in inflated dollars. EPA's methods for cost-effectiveness analysis underestimate these future costs; therefore, even when the costs are presented to communities, the actual costs in future years will be higher than those presented.

Recommendations: EPA should make every effort to prepare its Environmental Impact Statements in conjunction with project planning, through the "piggyback" process. It should work with agencies such as the MDC, since this may reduce planning delays. At present, EPA Region I will analyze alternatives which are illegal for the grantee under state and local law, but will not consider actions illegal under federal law (e.g. ocean dumping of sludge). We recommend that this viewpoint be broadened, so that the environmental impacts of all technically attractive alternatives are considered.

The costs for the whole proposed MDC expansion should be presented in all cost analyses, not just the impacts of individual projects (such as combined sewer overflows) as EPA currently requires.

Costs should be computed for average households and firms, using revised cost-effectiveness procedures. Such procedures should remove the current inconsistencies in the handling of capital and O&M costs, so that an accurate evaluation is presented to the community and used for grant determinations.*

Chapter 7: Operations and Maintenance

A basic premise of the Construction Grants Program has been that provision of capital funding will lead to improved pollution abatement. It has been assumed that communities would operate and maintain facilities as required, given support with the large capital expenditures. For the few communities (or industries) who do not operate their facilities acceptably, it has been assumed that a limited enforcement program would provide a sufficient incentive.

In the Boston area at least, it appears that more extensive Federal involvement will be required. Communities have little incentive to protect water quality downstream from them, and a strong desire to reduce costs. Public pressure to limit budgets has already led to failures of MDC plants over the long-term, and other municipalities feel that a "bailout" will be provided by EPA where necessary, so that maintenance can be deferred. Communities which were willing to fund their capital portions are resisting the high local costs of what is perceived as a Federal program.

In addition, operators are undertrained and underpaid, in relation to the technical expertise required to operate the plants effectively. Technical assistance by EPA and DWPC reaches only a few plants a year, and training programs have received very modest funding. Monitoring is normally done monthly through submission of self-monitoring reports to both the state and the EPA (the permit program is jointly run in the area), while inspections generally operate independently of regular monitoring. Enforcement has generally been reserved to date for areas which submit fraudulent reports, or which do not attempt to build the facilities necessary to meet their permit conditions. Enforcement actions against facilities built under the program have been rare.

Conclusions: Communities will attempt to reduce costs wherever possible. This will affect operator performance, chemical use, and regular operations to a degree (e.g., faciltiies run with less than optimum use of chemicals), but it will have its major impact on long-term maintenance. Any maintenance expenditure which can be deferred, will be; plants will age quickly, and need replacement much sooner than planned. According to the interviews, deferred maintenance is already occurring.

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*These problems remain even under the recent modifications: see the comments in Appendix E.

Problems in operator training will exacerbate this difficulty, leading to reductions in effluent quality at all plants, and generally to minimum acceptable performance. The limited enforcement role taken by EPA and the State simply means that "minimum acceptable performance" will be very low.

Recommendations: First, the enforcement effort should be expanded, and more capability for monitoring and inspection should be provided. However, this should be combined with some positive actions, since the communities must develop the capability to improve. Training should be increased, particularly continuing education for operators of current plants. EPA's budget for training facilities, instructional materials, and direct assistance should be increased.

Technical assistance should also be increased, either through increased staff in EPA or through the provision of Technical Assistance grants which will enable local governments to hire such expertise. Private sector provision of Technical Assistance might also lead to more knowledge of operations among plant designers, which would improve quality control.

However, there is no mechanism available now which will lead communities to provide long-term maintenance for their facilities. This is extremely important, and we feel that new legislation will be needed to protect the Federal investment in these facilities.

Chapter 8: Overall Planning and Institutional Issues

PUBLIC PARTICIPATION

Data on public participation are contained throughout the chapters of this report. For example, in the SENE process, a relatively limited number of public participants had a major role in goal formulation, and in the analysis of alternatives. Similarly, the 208 project and in EMMA, Citizen Advisory Committees have attempted to lead these studies to consider comprehensive planning issues such as overall system cost-effectiveness, impacts on water quality, water supply considerations, and recreation. The Boston Harbor CAC, formed by EPA as part of its review of EMMA, has had similar concerns. The members of these committees have been deeply involved in water pollution control and environmental issues; they are generally active members of environmental groups, and they are interested in developing the best alternatives for the region as a whole. Aside from SENE, however, they have not been very effective in getting these comprehensive issues considered.

The situation at the local level is somewhat different. EMMA, the 208 project, and the EPA EIS have all considered alternatives for individual communities. Comments on the 208 Preliminary Basin Reports suggested that the project did not initially consider options which the towns were willing to implement.* The public participation in EMMA and the EIS has been concerned with the location of sites for treatment plants, and community reaction has been strong: plant sites have been chosen in some cases, and the public participation has led to selection of sites which are probably acceptable to the areas concerned.

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*This has been modified in the actual plan, though current criticisms have suggested that the plan is almost totally responsive to town wishes, rather than actual needs.

Concern with system costs as a major objective only seems to occur after plants are built, except for a few communities. This concern is likely at present to be shown by reduced budgets for O&M, rather than by participation in the planning and design processes. It is effective, but earlier participation might lead to reduced costs and improved water quality, by changing the chosen alternative. There is some evidence that communities are becoming more concerned with costs in the planning stages.

Conclusions: We have seen three types of public participation, which occur at three different stages in the planning and implementation processes. First, the active public members attempt to introduce comprehensive planning issues in the overall plans. Their effectiveness is limited, but they directly address issues such as desired water quality, benefits from pollution control, and the use of innovative alternatives. These public citizens are often the primary "comprehensive planners" involved in wastewater management.

Second, when detailed plant sites -- or individual issues, such as pretreatment -- arise, interest groups become involved. This is shown by the activities of residents in resisting unacceptable plant sites, by industry involvement in pretreatment and ICR, and by other reactions to limited problems. In general, these groups are effective in achieving their goals, and they are listened to carefully, at the very least.

Finally, citizens who are not concerned directly with water quality, or with the impacts on their neighborhood, become involved when they get the bills. It is then too late to do anything but cut the O&M budget, so they put on pressure for reduced O&M, and particularly for deferred maintenance.

Recommendations: The role taken by active citizens, as comprehensive planners, is an important one. Other recommendations of this report suggest increased consideration of the comprehensive issues, and public involvement should be continued and expanded. More educational activities and technical support could aid this role.

No change is required in the involvement of those directly affected by proposed plans, which will affect their neighborhoods or industry groups.

We believe that the people who pay for the facilities should be involved more directly in project planning. Therefore, we recommend expanded public participation activities in the step 1 process, with increased step 1 funding by EPA to provide information necessary for effective public response.* This public participation should tell community residents about all the available alternatives so that they can make an informed decision. It may lead to more resistance in approving step 1 plans, but we feel that the ultimate result will be more community support for the chosen facility, and perhaps improved operation arising from that support.

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*EPA has proposed expanded step 1 public participation.

SUMMARY OF FEDERAL POLICY RECOMMENDATIONS

The Construction Grants Program, starting with the state Priority List, and concluding with the construction of facilities, dominates the Water Pollution Control program in the Boston area. This is not surprising, since Construction Grants has almost all the Federal money. However, the program is not directly related either to local needs or to water quality improvement, and it appears that certain changes are possible which would make it operate more effectively.

Therefore, our overall recommendations (including many of those mentioned above) can be divided into two types:

- those which increase the consideration of comprehensive planning issues (such as water quality improvement) in Construction Grants
- those which increase local flexibility in the implementation of facilities and controls, while also increasing local incentives for effective operation and maintenance

By the first, we mean that there should be consideration of the benefits arising from water quality, of water supply, of recreation, of growth management, and of a host of other issues. We also mean that water quality should be considered directly in the analysis of what should be funded. Our recommendations here include more public participation in the Priority List and the areawide plans, continued funding of 208 for areawide issues only, direct links between the Basin Plans and the Priority List, consideration of the full range of alternatives in environmental reviews, and others included above.

Under the second category, we believe that local governments are more likely to support facilities which they have chosen. Therefore, we believe that local governments should be supported in their analysis of nonconventional options, by EPA, DWPC, and the 208 agency. We also believe that they should be allowed to choose any effective option, if they are willing to pay the incremental cost over that of the most cost-effective option. We support grants for planning for nonstructural controls, improved operator training, and technical assistance. We believe that public participation in step 1 planning should be increased, and that costs should be presented for more than one alternative, and in both current and constant dollars, using improved analysis methods. Finally, we support increased enforcement and monitoring to ensure that the communities have an incentive to run their systems effectively.

These are, we believe, incremental changes in the current system, and they will work within the structure set by Congress. The only major weakness in the current structure is the inability of EPA to ensure maintenance of equipment in the local plants, and this appears likely to require a new legislative initiative.

CHAPTER 2

INTRODUCTION

Federal involvement in wastewater planning has undergone many changes since the initial Water Pollution Control Act of 1956. Perhaps the most significant changes occurred in 1972, with the Amendments passed under P.L. 92-500. This major revision of the law provided for such programs as

- the Municipal Facilities Construction Grants Program (Section 201), with billions of dollars annually to support construction of eligible investments in publicly owned treatment works and associated pollution control facilities
- river basin and areawide planning to guide these construction grants, under Sections 303(e) and 208, which established the state continuing planning process.
- permits for discharges, with specific requirements for the removal of pollutants by dates included in the legislation (the NPDES program)
- Environmental assessments of proposed projects, as also required under the National Environmental Policy Act (NEPA)
- Public participation under Section 101(e), which is to be "provided for, encouraged, and assisted," under at least minimum guidelines.

Implementing regulations by EPA have attempted to set procedures for carrying out these programs and requirements, and the law has been studied extensively by EPA, the National Commission on Water Quality (charged with analyzing effectiveness and proposing changes) and others. Recently, the Clean Water Act of 1977 provided adjustments to the 1972 Act in areas such as funding, deadlines, small-scale systems, and state management of construction grants.

This study is concerned with the realities of implementing the Water Pollution Control Program at the state, regional, and local levels. Using Boston as a case study, we have analyzed how the program has worked, what changes have been made to make implementation possible, and how the various pieces fit together to provide improved water quality. This portion of the Boston case study is specifically directed at the institutional, political, planning and management issues--at how the decisions have been made and what effect is expected by the decision-makers. We have not performed any analysis on whether these decisions are right, except as shown in the beliefs of the people

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*See Appendix C, Glossary of Acronyms, for all abbreviations.

involved. Questions of whether better facilities plans could be developed or whether the effect on water quality will be significant are addressed in the companion studies;* our aim is simply to determine how the process has worked, and what participants and observers see as its strengths and weaknesses.

Since the study is directed at the administration of the Clean Water Act, we are primarily concerned with how EPA could revise its regulations or policies to improve planning and administration of wastewater management, and with what type of amendments to the legislation may be suggested by the analysis. Our analysis examines the realities of the local situation within the constraints and incentives provided by the legislation and its implementating regulations. Issues which are devoid of national policy implications are not the concern of this study. Our analysis area is Boston, but our subject is the effect of the Federal water pollution control program.

2.1 WASTEWATER MANAGEMENT IN THE BOSTON AREA

In this section, the area and its institutions are introduced, to provide the reader with the vocabulary of Boston area wastewater planning. A more detailed description of powers and duties is contained in Appendix B, for readers unfamiliar with the local process.

Local Government

The study area (Figure 2-1) includes 109 communities surrounding Boston. The Commonwealth of Massachusetts is fully incorporated, with relatively weak counties that have little involvement in wastewater management,** and with most local power residing in the 351 cities and towns. Cities are generally governed by Strong Mayor (Boston) or Council/Manager (Cambridge) forms of governments, while the towns use either general or representative Town Meetings as their legislative bodies, with executive power residing in the elected Board of Selectmen. Other town bodies such as Planning Boards and Sewer Commissions may also have a role in wastewater management.

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*OTHER PHASE II STUDIES

Environmental Research & Technology, Inc. Phase II Study of Water Quality Goals and Objectives. Prepared for CEQ, to be released.

Environmental Research & Technology, Inc. Phase II Study of Sludge Management in the Boston Metropolitan Area. Prepared for NSF, to be released.

Kennedy Engineers, Inc. Phase II Engineering Report, Boston Case Study. Prepared for NSF, to be released.

PHASE I STUDIES:

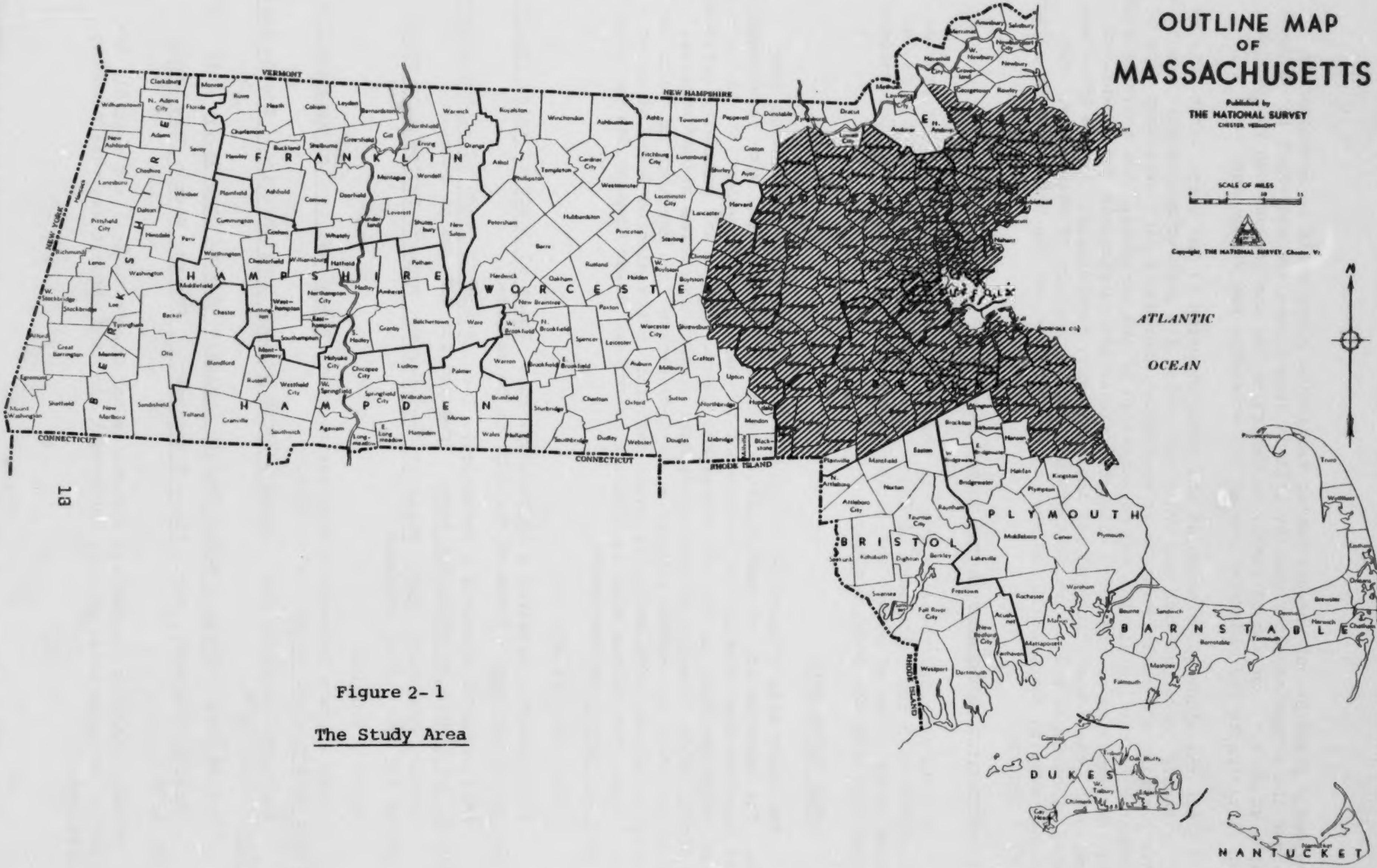
Urban Systems Research & Engineering, Inc. Phase I Wastewater Management Planning: Boston Metropolitan Area. July, 1976.

Resource Analysis, Inc. Phase I Water Quality Considerations, Boston Case Study. July, 1976.

Vertex Corp. Phase I Water Quality Analysis, Boston Case Study, July, 1976.

Kennedy Engineers, Inc. Phase I Engineering Report, Boston Case Study. July, 1976.

**Three counties (Berkshire, Barnstable and Duke's County) are actively involved in areawide water quality management planning through regional planning activities.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MASSACHUSETTS
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VERMONT
NEW HAMPSHIRE
NEW YORK
CONNECTICUT
RHODE ISLAND
BERKSHIRE
FRANKLIN
HAMPSHIRE
HAMPDEN
WORCESTER
MIDDLESEX
ESSEX
SUFFOLK
NORFOLK
BRISTOL
PLYMOUTH
BARNSTABLE
DUKES
NANTUCKET

Figure 2-1

The Study Area

Sub-State Regions

There are three types of regional agencies of interest to this study. The first are regional sewer districts, combinations of communities which jointly manage wastewater. For example, the South Essex Sewer District covers the communities of Salem, Peabody, Beverly, Danvers, Marblehead, and portions of other towns, while the Charles River Pollution Control District includes Medway and Franklin, with other towns likely to be served. The Metropolitan District Commission (MDC), which includes 43 of the study communities in its Metropolitan Sewer District (MSD) is something of a special case: while a sewer district, it is also part of the state government as an agency in the Executive Office of Environmental Affairs (EOEA), and it will be described below. Other sewer districts may be formed if they appear cost-effective; this requires agreement among the communities, and ratification by the state legislature.

The second type of regional agency of interest is the regional planning agency, which is the Metropolitan Area Planning Council (MAPC) for the study area. The MAPC received the funds for Areawide Wastewater Management Planning (208) and has also been involved in transportation, housing, and other areawide programs.

State Agencies

The state agencies of concern are primarily departments under the Executive Office of Environmental Affairs (EOEA) -- see Figure 2-2. The EOEA secretariat contains the Massachusetts Environmental Protection Act (MEPA) office, which reviews state environmental statements, and the Water Resources Commission, concerned with water supply planning and its relation to wastewater management. The Department of Environmental Quality Engineering (DEQE) has primary authority for permits related to environmental matters, and its Division of Water Pollution Control (DWPC) is the operating agency for the Construction Grants Program. DEQE is concerned with siting of plants, and with the regulation of on-site systems, septage, and sludge management.

The MDC forms another department of EOEA, and is under direct state control (though funds are provided by member communities--see Chapter 6.) Its Sewerage Division operates treatment plants and performs maintenance as required, while its Office of Environmental Planning and its Engineering Division are responsible for planning and constructing treatment works, respectively. The Office of Environmental Planning supervised the Eastern Massachusetts Metropolitan Area (EMMA) study of wastewater needs and facilities, which has been an important part of all wastewater planning in the region.

Outside of EOEA, the major actors at the state level include the General Court, which is Massachusetts' Legislature, the Office of State Planning, and the Governor's Office, which is concerned with growth policy.*

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*With the adoption of the state's Coastal Zone Management (CZM) Plan on April 1978, another state agency is concerned with facilities planning within the coastal zone. The CZM plan imposes consistency requirements on 201 plans within this area (Policy 26, p. 95 of the Mass. CZM program).

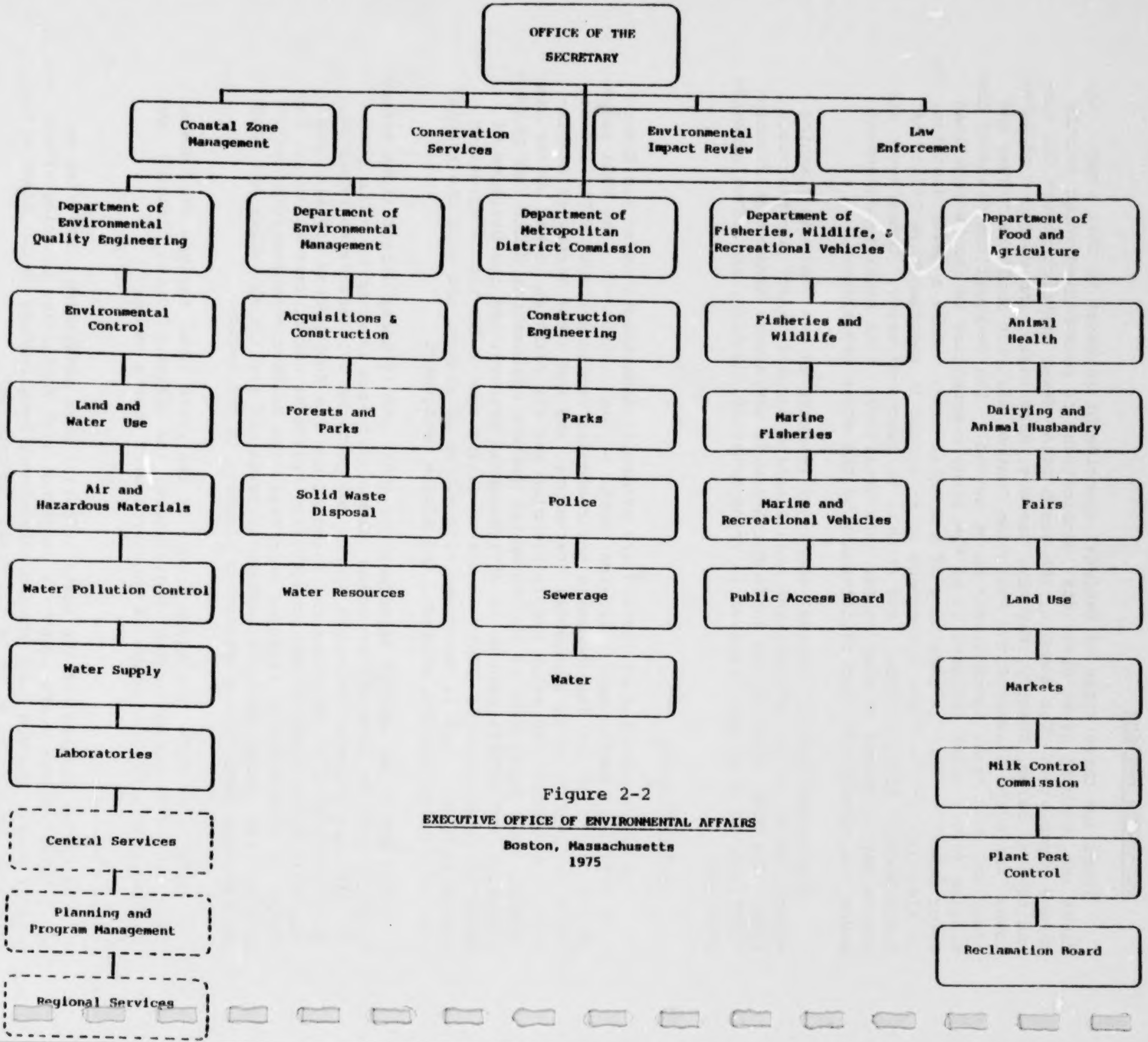

OFFICE OF THE SECRETARY
Coastal Zone Management
Conservation Services
Environmental Impact Review
Law Enforcement
Department of Environmental Quality Engineering
Environmental Control
Land and Water Use
Air and Hazardous Materials
Water Pollution Control
Water Supply
Laboratories
Central Services
Planning and Program Management
Regional Services
Department of Environmental Management
Acquisitions & Construction
Forests and Parks
Solid Waste Disposal
Water Resources
Department of Metropolitan District Commission
Construction Engineering
Parks
Police
Sewerage
Water
Department of Fisheries, Wildlife, & Recreational Vehicles
Fisheries and Wildlife
Marine Fisheries
Marine and Recreational Vehicles
Public Access Board
Department of Food and Agriculture
Animal Health
Dairying and Animal Husbandry
Fairs
Land Use
Markets
Milk Control Commission
Plant Pest Control
Reclamation Board

Figure 2-2

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

Boston, Massachusetts
1975

Federal Agencies

EPA's role is the most significant of any Federal agency, and is implemented from the Region I headquarters in Boston. EPA operates the NPDES permits program, with state support, and has ultimate responsibility for the operation of the Construction Growth Program in Massachusetts. While some review responsibilities in this program have been delegated to the state (certification of plans and specifications, and much Step 2 review), EPA still performs a limited review of these and detailed review of Step 1 plans. EPA also has the responsibility of preparing environmental assessments (and impact statements, if necessary), and has enforcement responsibility against firms and municipalities which do not comply with the provisions of the act.

Another major Federal agency of concern is the New England River Basins Commission (NERBC), one of a number of such commissions nationwide which are concerned with river basins planning and water resource development. NERBC was responsible for the "Level B" study required under Section 209 of P.L. 92-500, known as the Southeast New England (SENE) study.

Finally, the Corps of Engineers has been directly involved in wastewater and water resource planning in the area. The Corps was a participant in EMMA, and has been concerned with flood protection through both structural and nonstructural methods, and with the problems of both urban and rural water supplies.

Public Interest Groups

There are a number of types of public interest groups concerned with wastewater management in the Boston area. Among local groups, the various watershed associations are paramount. For example, the Charles River Watershed Association (CRWA) has been directly involved in wastewater planning for the river since before the beginning of EMMA; others have shown similar records, and still others, like the Ipswich River Watershed Association, have been to some extent the result of public participation programs (see Chapter 4). Boston Harbor Associates, while not a watershed association, performs a similar role as watchdog for the harbor.

Statewide environmental organizations have also been concerned; examples include the Sierra Club and the Conservation Law Foundation. Industries have been less directly involved, though the Construction Industries of Massachusetts have participated in the 208 public involvement program and the Associated Industries of Massachusetts, the Chamber of Commerce, and various specific industry groups have spoken out on particular issues (e.g., pretreatment).

Consultants

Consultants are an important factor in the implementation of wastewater management, particularly in construction grants. Almost all facilities planning, design, and construction is supervised by consulting engineering firms, while other firms are involved in environmental assessments, management procedures, or studies such as this one. For example, Metcalf & Eddy (M&E), one of the nation's largest environmental engineering firms, was prime contractor for the EMMA work, performed industrial wastewater surveys for MDC and MAPC and continues to work on implementation for the MDC: the firm is one of the subcontractors for the on-going combined sewer overflow facilities planning, where the prime contractor is Camp, Dresser, & McKee (CDM). CDM performed an earlier regional sewerage needs survey (for MAPC), and is contractor to Boston and other area communities. Other firms, such as Anderson-Nichols, Havens & Emerson, EcolSciences, and Geraghty & Miller have been participants in the process at various points as consultants to communities, sewerage districts, and planning agencies.

2.2 THE WASTEWATER PLANNING PROCESS

This report is organized around a view of the wastewater planning process which we believe was the goal of the Congress when it passed P.L. 92-500. This process, shown in Figure 2-3, starts at the broadest and most conceptual level, and successively narrows down the concern until individual facilities are built and effectively operated. As will become apparent in the succeeding chapters, this is not always a correct view of reality, but it provides a model of how things are supposed to work, and this framework is useful in presenting our analysis. It is, in essence, a picture of the nominal planning process which we use in pointing out areas where actual practice is at variance with the underlying basis of the Federal policy.

The first stage in the proposed process is Master Planning, where the overall relationship between water resources and other issues and programs (such as transportation, land use, growth management, and corrections) is defined. Master Planning, for example, might attempt to direct that both water resources and transportation be made available to a developing area, or suggest (as the Commonwealth has) that infrastructure resources should be used in existing urban areas in an attempt at revitalization. Water Resources Planning is a subset of Master Planning, concerned with the relationships among water supply, wastewater management, flood control, and other water-related programs. It is here that water conservation, interbasin transfer, and the pollution of water supply sources are discussed and resolved.

In a static world, Water Resources Planning could be followed directly by Areawide Wastewater Planning, which would analyze point and nonpoint sources of pollution, investigate measures for pollution control, and determine which areas should receive structural and non-structural solutions. As envisioned in P.L. 92-500, the Areawide Wastewater Planning Program would also define the non-structural measures and carry them through to implementation.

Facilities Planning would then look at the areas where structural solutions were desired, defining the facilities which would perform the pollution abatement, and choosing the most cost-effective and environmentally-sound option. Design and Construction would use Federal funds to implement those facilities.

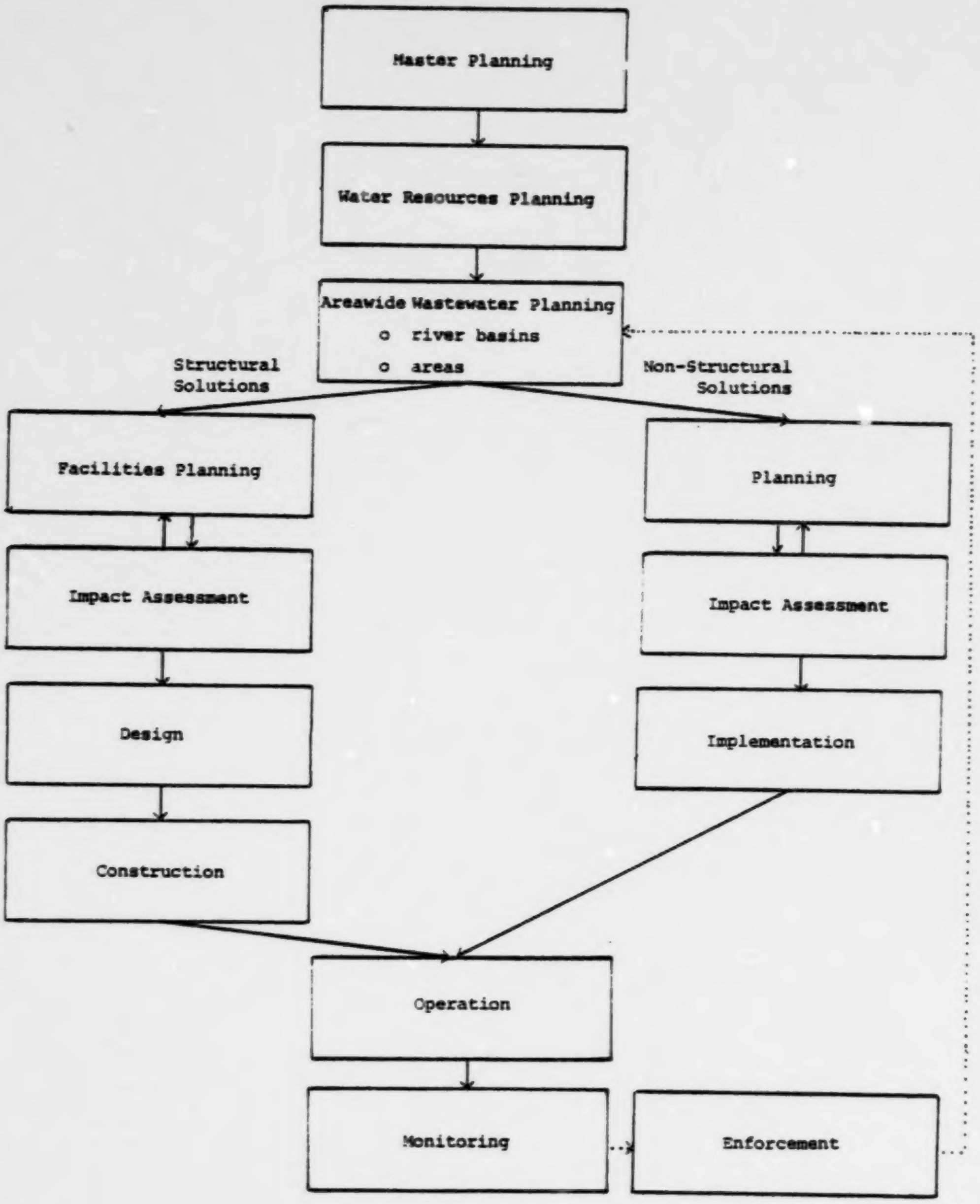
For both Areawide and Facilities Planning, Impact Assessment is required, for economic, environmental, and other impacts. This step is generally performed by EPA before the Areawide or Facility Plans are implemented.

Once the facilities are implemented, they must be Operated and Monitored for their performance. If necessary, Enforcement may occur, or -- as facilities get old or standards change -- the process may begin again.

This is a classic model of a static, top-down planning framework, which includes the requirements under P.L. 92-500, apparently as Congress intended the program should work. It is important to note that different institutions are operating at the various levels, and that there are continual feedback loops related to both the dynamic nature of the real process, and the requirements for decisions at different levels of detail. For example, Master Planning should coordinate between wastewater requirements and prisons; in fact,

Figure 2-3

WASTEWATER MANAGEMENT PROCESS


Master Planning
Water Resources Planning
Areawide Wastewater Planning
o river basins
o areas
Structural Solutions
Non-Structural Solutions
Facilities Planning
Impact Assessment
Design
Construction
Planning
Impact Assessment
Implementation
Operation
Monitoring
Enforcement

the Deer Island Treatment Plant and the Deer Island House of Corrections compete for space, and this has been resolved in the analysis of structural solutions by negotiation and Congressional action.

2.3 MAJOR AREAS OF INTEREST

The nominal process described above has been implemented through numerous regulations and policies, through the provision of guidance documents, and through extensive negotiations which occur in every phase of the process. Each part of the process occurs in conjunction with the other parts, and tensions arise within and across the various stages of planning, construction, and operation.

Within each stage, this report is concerned with the ways in which the process works, the effects of particular Federal regulations and policies, the technical issues of concern, and the ways decisions are made. In particular, we are interested in comparing the nominal process, as described in the Act and EPA regulations, with what actually occurs. We are also interested in the role of public participation, the interactions among the various interested parties (e.g., EPA, the DWPC, communities, and consultants in facilities planning), and the ways data are generated and analyzed. The following five chapters, which focus on the major stages in the process, are primarily concerned with the workings of these individual stages. In them, the major issues can be summarized by:

- What types of decisions are made?
- Who makes those decisions, and by what process?
- What information is used?
- What is the effect of Federal policies? and
- How does the real process compare with the nominal one?

However, the interactions among the various stages is equally important. One of our findings, for example, is that the expenditures of the Construction Grants Program tend to dominate the system, with the other stages often shrinking to insignificance in comparison. Themes such as this appear throughout the process. Some of the issues which arise in looking across the various planning stages include:

- What is the relative importance of the various stages, with respect to improvement of water quality?
- How are water quality and other goals related to the implementation of the supposed solutions?
- Who bears the costs and benefits?
- Who makes the decisions? Where does control over the process lie, if anywhere?
- What is the overall impact of public participation and, in fact, who are the "public"?

2.4 METHODOLOGY AND LIMITATIONS

Interviews constituted the primary source of information for this study. The interviews were loosely structured by a list of appropriate issues to be covered, although, in many cases, discussions ranged over related topics. An important part of the methodology involved finding support for statements made in the course of interviews in the documentary evidence. Documents reviewed included facilities plans, the EMMA Study Main Report and its appendices, basin reports published by the Massachusetts Division of Water Pollution Control and the MAPC Water Quality Project, the state's priority list (main and extended), memoranda from EPA, the Commonwealth, various planning agencies, and citizens advisory groups and other local documents as necessary.

The interviews were conducted off-the-record, except where prior agreements were made. In all cases, points made in this report were corroborated either through the published and unpublished documents, or through other interviews.

Most of the analysis undertaken in this study was necessarily qualitative, with the analysis of financial impacts presented in Chapter 6 forming the major exception. The methodology used in developing these impacts is presented in Appendix D. In many cases, the interview process was an iterative one, consisting of an initial formal interview and document gathering, which was followed up with telephone or personal contacts as further information was needed. A list of people interviewed is presented in Appendix A. Appendix E presents comments received through public review of the full draft report, from people interviewed and other interested parties.

We should insert two caveats at this time. First, the report is only current to January 31, 1978; any changes since that date, particularly in the implementation of the 1977 Amendments, are not included here except through updating notes which have been added.

Finally, the study is based on data from the Boston Metropolitan Area, and in a few cases, other surrounding sites. We believe that it has significant implications for Federal policy, which was the goal of the case study. However, it is clearly possible that issues or trends which appear significant from an analysis of the Boston area are much less important elsewhere. Therefore, we believe that this analysis should not be used as the only basis for changing Federal regulations or legislation, and that the importance and validity of some of our results should be confirmed elsewhere before policy changes are made.

Given these caveats, which are defined by the limits of this study, we believe that the data provided in this report are accurate, and that the conclusions reflect the way wastewater management and planning has occurred in the Boston area. We also believe that the effects of Federal policies can be effectively analyzed in this context, and that the recommendations developed here should be pursued, to lead to improved wastewater management for Boston and other areas of the country.

2.5 STRUCTURE OF THE REPORT

The following five chapters are organized around the stages of the nominal planning process described above. Chapter 3 describes Master Planning and Water Resources Planning, including issues such as the role of the NERBC and SENE, the coordination of wastewater planning with water supply planning, and the relationship of wastewater planning to land use and growth policy.

Chapter 4 is concerned with Areawide Wastewater Management Planning, and its two forms of implementation under P.L. 92-500: the river basin plans and wasteload allocations, prepared by the states under Section 303(e), and the areawide plans prepared under Section 208 by the states and regional agencies. Issues include planning for non-point sources and residual wastes such as septage; setting of water quality goals; and the like.

In Chapter 5, facilities planning, design, and construction are analyzed. This is where most of the funds under the program have been spent, and is an area where the detailed operation of the process is important. We are concerned with the guidance given to local communities, the reviews performed by EPA and the Commonwealth on plans, the standards required by the Act, and the methods available to EPA to enforce satisfactory progress towards pollution control.

Chapter 6 then looks at the process of impact assessment, where the costs and impacts of the various alternatives are developed, and presented to the communities involved. Impact assessment is a requirement for both areawide and facility plans at this point, but it is also an important vehicle for public participation and a way EPA can gain some control over the local planning. This section contains some new estimates of the economic burdens expected from implementation of the proposed system for the Boston area.

Operation and Monitoring are the concerns of Chapter 7, which looks at what happens once a system is built. It is concerned with reactions to charges for energy, chemicals, and other necessities; with technical assistance and training, and with possible Federal approaches to increase the likelihood of proper operation.

Finally, Chapter 8 looks at what can be learned from these stages of the wastewater management process, through a number of central threads which appear throughout. These central threads reflect the interactions among the various planning stages, as discussed in Section 2.3, above, and form the basis for the recommendations about the overall process developed in Chapter 8.

CHAPTER 3

COMPREHENSIVE PLANNING FOR CLEAN WATER

Introduction

The planning of wastewater systems should, in theory, at least, be coordinated with other forms of planning in a region. It is desirable to have new growth served by both sewers and highways; it is also desirable to avoid placing sewers along coastal beaches where attempts are being made to curb development. Water supply issues should be considered for wastewater planning: for example, estimates of domestic sewage flow in planning studies should be less than projected domestic water use, for consistency.

The Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act of 1977 makes use of two major procedures which attempt to coordinate among plans and programs: the water and related land use plan under Section 209 of P.L. 92-500, and the A-95 review process. (see Figure 3-1).* The former, also referred to as a "Level B" plan, attempts to develop water resource plans for large basins, set goals, provide a framework for more detailed planning efforts, and consider water pollution control jointly with water supply and land use.

The A-95 process has more limited goals. Whenever a project is submitted for Federal funding, the state and regional A-95 Clearinghouses distribute information about it to a set of designated agencies and public interest groups, who are supposed to look at the impacts of this project on their plans. If a conflict exists, they may either suggest revisions to the project, or revise their own plans accordingly. For example, a sewage treatment plant might include joint development of open space in its plan, which could lead recreation planners to revise their plans for resources to other parks. Where the Level B plans attempt to take a comprehensive look at the large scale issues before detailed planning, the A-95 review acts on a more localized area, and reviews individual projects.

There are a few general rules which characterize the way most attempts at comprehensive planning are supposed to work, and which influence the expectations of most observers about the comprehensive wastewater planning process:

- The planning process should start with the identification of problems and the establishment of goals, proceed to the formulation of overall strategies, and finally result in detailed plans for implementation.

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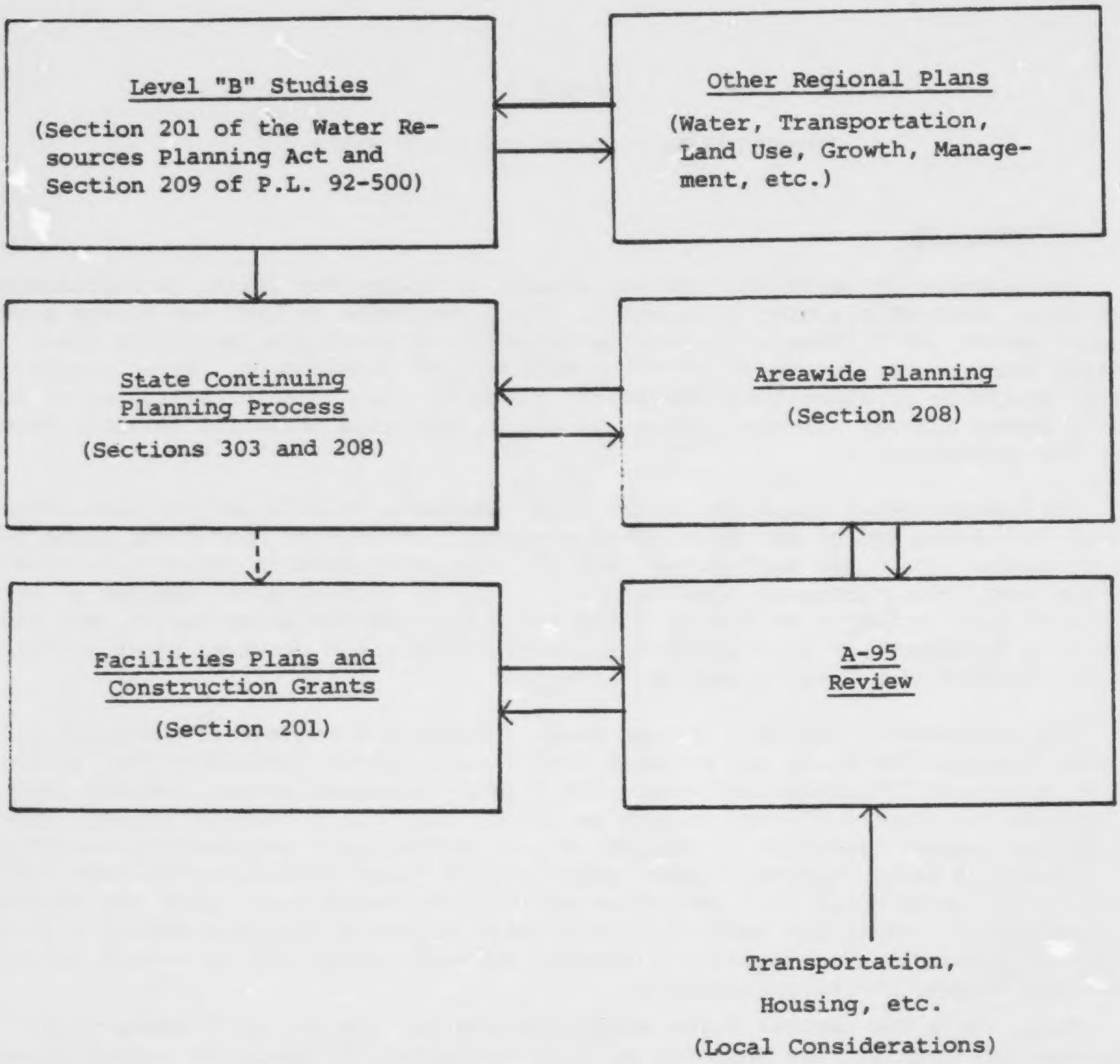
*Office of Management and Budget circular A-95. July 24, 1969, et. seq.

Figure 3-1

WATER RESOURCES AND WASTEWATER COORDINATION


Level "B" Studies
(Section 201 of the Water Resources Planning Act and Section 209 of P.L. 92-500)
Other Regional Plans
(Water, Transportation, Land Use, Growth, Management, etc.)
State Continuing Planning Process
(Sections 303 and 208)
Areawide Planning
(Section 208)
Facilities Plans and Construction Grants
(Section 201)
A-95 Review
Transportation, Housing, etc. (Local Considerations)

- The planning process is supposed to begin at a large geographic scale and progressively narrow its focus to smaller geographic areas. For example, the Level B studies are supposed to provide not only a broad view, but a uniform data base for more detailed studies.

- The planning process is supposed to coordinate all activities which affect or are affected by water pollution control actions. Issues of water supply and water-based recreation are obvious examples, but there is a broad range of activities which are potentially affected, including land use planning, energy transportation, and air quality. By coordinating these activities on the comprehensive planning level, it is assumed that potential conflicts can be removed before plans become fixed.

- The planning process should involve active public participation from its earliest phases. By involving the public in the planning process from the earliest definition of issues and establishment of goals, and continuing its involvement all the way through the design of specific facilities, the interests of the public will be protected and a constituency for program implementation will be established.

These goals for comprehensive planning might appear obvious, but they have proven difficult to achieve in the Boston area. The rest of this chapter examines, through the use of examples, some of the difficulties that arise. Section 3.1 investigates the coordination of wastewater planning and water resources, both through Southeastern New England Water and Related Land Resources Study (SENE, the Level B report), and through other methods. Section 3.2 then analyzes the relationship between wastewater planning and the planning of other facilities, through both A-95 review and other channels. Finally, Section 3.3 provides our conclusions and recommendations related to the comprehensive planning process.

3.1 WATER RESOURCE PLANNING

Historically, the planning of water supply and of water pollution control have been performed separately in the Boston metropolitan area. Although a single agency, the MDC, has been the principal water supply agency in the Boston area as well as the principal wastewater treatment agency, the two activities have been operated independently. This is possible because the major sources of water supply lie outside the MDC district, or, as one planning official succinctly put it, "We take our water from the west and dump it on the east."* The interdependence of water supply and wastewater management, and the relationships between water resources and growth, energy, transportation, and other aspects of planning have become apparent. Various planning efforts have attempted to to address these relationships; the three major ones are SENE, the Massachusetts Water Supply Policy Study, and the Massachusetts Growth Policy Study.

SENE

The Southeastern New England Study (SENE) is the Level B study required under Section 209 of P.L. 92-500 though it was initiated before P.L. 92-500 was passed. This section requires that the River Basins Commissions (in this area, NERBC) prepare such plans for all basins in their jurisdictions, giving priority to areas expected to be designated under Section 208. The SENE report is subtitled "A Strategy for Balanced Development and Protection of Water and Related Land Resources in Eastern Massachusetts and Rhode Island," which fits the requirements of the Water Resources Planning Act for the coordination of plans for the development of water and related land resources and for the preparation and updating of river basin plans.**

SENE's recommendations are shown in Figure 3-2; they cover a wide range of topics from water supply to facilities location and are not limited to water quality in any way. The process by which these overall recommendations were developed is significant:

o First, baseline data on resources were gathered and synthesized, primarily by the use of map overlays covering the region.

o Second, analysis was performed along functional lines, with water supply analyzed independently from energy development, e.g., alternative solutions for each functional area were prepared.

o Overall scenarios were then applied to prepare functional area plans; one of these scenarios emphasized environmental quality, a second economic development, and the third attempted to take a mixed path considering both objectives.

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*The interaction between water resource and wastewater treatment planning in the MDC is analyzed in more detail in USR&E's Metropolitan Water Management: Case Studies and National Policy Implications, 1971.

**P.L. 89-90, Section 201(b), et. seq.

Figure 3-2

OVERVIEW of SENE Recommendations

RECOMMENDATIONS

GUIDING GROWTH (Chapter 3)

Planning Objective: *To suggest strategies for protecting the critical water and related lands resources of SENE while accommodating economic activities and guiding growth.*

• 1. Increase protection of Critical Environmental Areas: priority protection and other protection areas.
• 2. Improve management of Developable Areas by resource capability, judicious use and expansion of infrastructure, and regulation of large-scale development.

WATER SUPPLY (Chapter 4)

Planning Objective: *To meet municipal needs for adequate supplies of fresh water in the most economically feasible and environmentally sound manner.*

Everywhere
• 1. Maintain and protect existing water resources.
• 2. Prefer local ground water to intermunicipal surface water to interbasin transfer.
o 3. Limit water consumption through education and water saving technology.
* 4. Acquire key watersheds and potential well sites.
5. Establish regional water management agencies.
6. Study advanced technologies leading to new sources of water.

Ground water dependent areas
o 7. Survey ground water location, quantity and availability.
* 8. Restrict activities shown to be hazardous to ground water quality.
* 9. Limit ground water withdrawal to maintain stream levels.
10. Monitor saltwater encroachment in coastal aquifers.
11. Provide recharge basins to capture storm runoff.
12. Establish state ground water boards.

Surface water dependent areas
• 13. Expand MDC sources by completing the Northfield Mountain Facility. Carry out conservation measures. Plan the Millers River Facility.
* 14. Encourage regionalization of water supply systems.

WATER QUALITY (Chapter 5)

Planning Objective: *To achieve swimmable fishable waters by 1983 wherever realistically attainable economically, socially, and technically.*

Preservation
• 1. Stress anti-degradation in areas now swimmable-fishable.
o 2. Carry out current state non-degradation policies.
* 3. Attenuate runoff from new urban developments.
* 4. Negotiate acceptable low flow regimes with upstream communities.
5. Provide streambank buffer strips.

Restoration
• 6. Emphasize treatment of urban stormwater overflows.
• 7. Accelerate federal grants for municipal wastewater treatment.
• 8. Continue current industrial permits program.
o 9. Begin regionwide stormwater and wet-weather stream sampling.
o 10. Make towns responsible for septage waste disposal.
* 11. Determine municipal sludge disposal policy on plant-by-plant basis.
* 12. Place burden on industry for disposing hazardous wastes.
13. Study and define the landfill leachate problem.
14. Provide pumpout facilities and treatment for watercraft wastes.

Area priorities
o 15. Give priority to Cape Cod, New Bedford, Providence, and Boston.

The priority of the recommendation is indicated by the symbol preceding it.
• Highest priority recommendations (18)
o High priority recommendations (28)
* Other priority recommendations (39)
(Blank) Remaining recommendations (43)
Priority was assigned to the recommendations according to their significance in meeting the objective of each chapter. Consideration was given to those policies and actions which are expected to meet the greatest needs the fastest and which support, most directly, the three themes of the Study.

OUTDOOR RECREATION (Chapter 6)

Planning Objective: *To meet 1990 recreation needs in economically, environmentally, and socially acceptable ways.*

Swimming
• 1. Expand facilities at existing state beaches and parks.
2. Study beach erosion control.
3. Study beach expansion.
o 4. Manage public access to shoreline.

Boating
o 5. Form state boating advisory committees.
6. Undertake authorized channel and anchorage improvements.
7. Investigate new regional marina basins.

Salt water fishing
o 8. Construct public boat ramps and fishing piers.
9. Encourage private construction of boat ramps and fish piers.

Camping and picnicking
* 10. Form state recreational advisory committees.
o 11. Expand state forests and parks near tourist centers.

Wildlife and fresh water fisheries
* 12. Acquire SENE's most important upland and wetland wildlife habitat.
13. Acquire SENE's most important streambanks.
14. Acquire public access to ponds.
15. Enforce wetlands legislation and local zoning regulations.

Extensive outdoor recreation
• 16. Develop Boston Harbor Islands and Narragansett Bay Islands Park.
o 17. Develop guidelines for limited recreation on selected storage reservoir lands.
o 18. Make multiple use of urban lands.
o 19. Implement or develop scenic rivers legislation.
* 20. Expand existing forests and parks near urban centers.
21. Develop a regional trail system.

MARINE MANAGEMENT (Chapter 7)

Planning Objective: *To maintain the region's renewable marine resources at a level sufficient for a sustained future use and to develop the region's nonrenewable marine resources in an environmentally sensitive manner.*

Offshore fisheries
* 1. Declare interim offshore 200-mile economic zone.
* 2. Adopt national fisheries management policy and program.
3. Increase tariffs on imported fish products.
4. Allow privately financed purchase of foreign-built fishing boats.
5. Improve market for underutilized fish species.
6. Accommodate coastal fishing facilities through improved planning.

Shellfish and aquaculture
7. Increase Mass. technical assistance for local shellfish management.
8. Increase shellfish license fees in Massachusetts and require recreational licenses in Rhode Island.
9. Develop underutilized shellfish market.
* 10. Research removal of virus and bacteria to enhance shellfish habitats.
* 11. Site new wastewater discharges away from estuaries.
12. Enact aquaculture legislation in Rhode Island.
13. Investigate potential aquaculture sites.
14. Increase technical assistance to towns for aquaculture.
15. Increase research on use of wastewater for aquaculture.

Port development
• 16. Plan regionwide port development.
17. Continue interim dredged materials disposal procedure.

Offshore sand and gravel
* 18. Develop state policy and program regulating mineral extraction activities in coastal waters.
19. Coordinate future federal lease leasing with adjacent states.
* 20. Develop predictive modeling techniques.

Urban waterfronts
21. Coordinate local waterfront planning and development.
o 22. Provide guidelines and set criteria for priority waterfront uses.
23. Review and coordinate waterfront use at state and substate regional level.
* 24. Support state and local waterfront development plans.

FLOODING AND EROSION (Chapter 8)

Planning Objective: *To reduce flood damages in the region, both riverine and coastal, and to reduce critical coastal erosion.*

Flooding
o 1. Prepare flood plain programs with non-structural emphasis.
* 2. Adopt zoning to regulate new flood plain construction.
* 3. Establish local regulations to control runoff and erosion.
4. Provide technical assistance to local officials.
5. Acquire key flood plains and wetlands.
6. Locate in existing safe buildings in the flood plain.
7. Require relocation out of flood plains where appropriate.
* 8. Discourage reconstruction or redevelopment after storm damage.
9. Update and establish flood warning and evacuation programs.
10. Increase funding for storm forecasting.
* 11. Amend and strengthen administration of wetland laws.
* 12. Construct flood protection projects selectively.

Erosion
13. Establish local sediment and erosion control ordinances.
o 14. Manage critical erosion areas through state coastal zone programs.
* 15. Protect critical coastal erosion areas under local regulations.
* 16. Encourage natural stabilization of coastal erosion area.
17. Construct erosion control projects selectively.
18. Build or restore salt marshes.

LOCATING KEY FACILITIES (Chapter 9)

Planning Objective: *To provide certain vital services to society – power, fuel, construction materials, solid waste disposal – in a manner which supports continued economic growth and minimizes the negative environmental impacts such facilities have traditionally had.*

Onshore sand and gravel extraction
o 1. Centralize minerals management authority.
* 2. Conduct state minerals resources survey in Massachusetts.
3. Create public education program for minerals management.
* 4. Promulgate minimum state extraction operation and rehabilitation standards.
* 5. Provide state guidance to municipalities on extraction permits.
* 6. Reclaim selected abandoned extraction sites for recreation.

Electrical power
o 7. Create state energy conservation education program.
* 8. Provide state technical assistance on state energy consumption rate reduction goals.
o 9. Implement program of mandatory and voluntary energy saving measures.
* 10. Study electric rate schedules, encourage off-peak power use.
o 11. Identify and secure power plant sites for future use.
• 12. Avoid Critical Environmental Areas for future sites.
o 13. Maximize development capabilities at existing power plant sites.
* 14. Upgrade or phase out inefficient fossil units near cities.
* 15. Put transmission and distribution lines underground in urban redevelopment programs.
* 16. Provide interim recreational use of undeveloped power plant sites.
• 17. Simplify procedures for power plant licensing.

Petroleum facilities
o 18. Revise new building standards to improve heating-cooling efficiency.
* 19. Provide tax incentives for voluntary energy-conservation measures.
• 20. Provide state energy-consumption rate reduction technical assistance.
* 21. Fund mass transit systems.
o 22. Establish petroleum facilities siting authority in Rhode Island.
o 23. Strengthen petroleum facilities siting authority in Massachusetts.
* 24. Consider New England-wide implications of siting decisions.
o 25. Establish standards and criteria for refinery siting and operation.
* 26. Use SENE Study development capability analysis in siting decisions.
o 27. Establish deepwater ports; evaluate sites individually.
o 28. Locate refineries and related development inland near infrastructure.
* 29. Distribute refined products by pipeline wherever feasible.
* 30. Use most advanced technologies in facilities operation.

Solid waste management
* 31. Enforce existing sanitary landfill regulations.
o 32. Fund the Rhode Island solid waste management program.
33. Accelerate local participation in state recovery programs.

HOW TO PROTECT OUR NATURAL RESOURCES (Chapter 10)

Planning Objective: *To ensure appropriate action taken with regard to planning recommendations.*
• 1. Maximize use of existing resource policy institutions.

- Finally, all of the functional area plans were brought together in an impact analysis, focusing on the effects of various regional growth policies.

Public participation formed an extremely important part of this process. The study formed an overall Citizen's Advisory Committee, which set up subcommittees for the analysis of Goals and Objectives, and the performance of Public Review and Public Participation. In addition, Basin Advisory Committees were set up for each of ten subareas, and public meetings were held regularly in each basin. These appear to have been less effective than the CAC.* The total cost of this program was about 15% of the SENE budget, not including donated technical staff time or final report publication.

The effects of public participation are harder to measure, but appear to have been significant. Staff members on the project and involved citizens feel that the public participants had a major role in shaping the study, both in the overall report and in the various sub-areas. The Regional Report states that the CAC meetings "...provided valuable information in shaping the Study's findings. Furthermore, the (CAC) donated their time generously in developing and in transmitting review comments to the staff for several versions of the regional and planning area reports..." It describes the actions of the Basin Committee as follows:

> "BAC's met during at least three phases of the Study: early--to define local problems and opportunities; midway--to examine the Study's proposed alternatives; and toward the end of the Study--in informal hearings to comment on the draft recommendations and their correspondence to citizen preferences. A total of 900 citizens had attended the nearly two dozen meetings by the end of the second phase of the Study. Interested citizens received background information prior to the meetings. This was the basis of worksheets and questionnaires which they completed during the meetings. The results of these materials were then tabulated and used in developing the Study's recommendations.**

Public participation in SENE's goal-setting and developing of recommendations seems to have been viewed as successful by all participants. The recommendations are felt to reflect the views of the public participants, both for the individual basins and for the region as a whole.

However, an apparently successful exercise in Master Planning does not necessarily mean that the recommendations will have any impact. With respect to water quality, SENE's highest priority recommendations are to:

- stress anti-degradation in areas now swimmable/fishable;
- emphasize treatment of urban stormwater overflows;
- accelerate Federal grants for municipal wastewater;
- continue current industrial permits program.

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*M.O. Ertell and S.G. Koch. Citizen Participation in Comprehensive Water Resources Planning. University of Massachusetts. OWRT B-044-Mass., Aug., 1976.

**SENE Regional Report, PP M-5 and M-6.

Secondary priorities for the region include:

- carry out current state non-degradation policies;
- begin regionwide stormwater and wet-weather stream sampling;
- make towns responsible for scavenger waste disposal.

These recommendations are also included, with some further detail, in the local report for the Boston metropolitan area.* Some of them have not been covered in our study, such as the non-degradation recommendations; others, however, are discussed further in the following chapters.

In general, it appears from the later planning actions that the goals and recommendations of the SENE project have been used in a piecemeal fashion by others, since the sheer number of recommendations provided something for everyone. For example, supporters of treatment plants in particular communities have taken the individual SENE recommendations and attempted to apply them to those sites. Similarly, supporters of the Northfield Mountain water diversion, and the Boston Harbor Islands State Park, have used SENE as one voice in their favor, as have growth control advocates in a number of areas. Where SENE's recommendations have not had advocates, however, implementation has been less likely. It called for extensive wet weather and stormwater sampling, for example, and the current sampling programs have not been emphasized by DWPC and MAPC. The report recommended immediate correction of Combined Sewer Overflows, but EPA policy gives secondary treatment a higher priority (due to requirements of P.L. 92-500), so SENE's recommendation is not being implemented directly. Other SENE recommendations, such as analysis and correction of landfill leachate problems, are only a minor point in the 208 plan. The recommendations are the result of careful analysis, but they have little direct connection to the implementation process, and have not been implemented except in special cases where advocates have appeared for them.

Where the SENE recommendations have agreed with the goals of planners further along in the process, they have been included in other plans. Where they have not, they have generally been ignored. The problem with the study is not its recommendations, but the lack of ability to implement those recommendations, except where other planenrs agree. Any attempt at coordination, therefore, depends on it being in the interest of the planners in each functional area to coordinate; the SENE Plan has relatively little effect.

The uses of the SENE data base show a related implementation problem. SENE developed detailed maps of the area, eith definition of critical environmental areas, developable land, and analysis of the development capability of various sites. The 208 project, however, has partially repeated this analysis at a different scale, because of somewhat different needs. Some of the SENE information was used, but it was not sufficiently detailed to form the data base for the 208 work. Since the 208 project has different goals and incentives, it would have been surprising if the SENE data were either necessary or sufficient.

SENE provided an initial review of the important water and related land resources issues in the study area. It developed the goals for water resources management, and made a series of recommendations about areawide and local issues. However, these recommendations seem to have gotten lost in the latter stages of planning, with little net impact on the coordination of various activities, or on the work performed in the Continuing Planning process.

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*NERBC. Report of the Southeastern New England Study: 2. Boston Metropolitan Area Report. December, 1975.

Massachusetts Water Supply Policy Study

The need for continued comprehensive water resource planning has been emphasized by the Massachusetts Water Supply Policy Study commissioned by the state's Executive Office of Environmental Affairs. The draft report notes that "the Commonwealth has no explicit, coordinated, long-range policy" for water supply.* This report notes a number of instances where planning of water supply, land use, and wastewater treatment have not been adequately coordinated:

> Long range '208' areawide sewerage programs are proceeding independently of water supply programs and at the same time that '201' construction projects are building sewers in a 'spend-the-money- before-it-is-gone' manner...Sewers have been laid through groundwater supplies, floodplains, and high hazard coastal storm damage areas. Fish and wildlife funds have been spent for facilities that are located within potential reservoir-storage pools. Road salt has been stored in piles adjacent to recharge areas for town wells.

The report recommends that the Massachusetts Executive Office of Environmental Affairs create a state water resources department which would have responsibility for water supply planning and/or 208 planning.** This recommendation has not been adopted, but the Massachusetts Water Resources Commission, composed of the key state water supply and water pollution control officials, has been given responsibility for coordinating planning. The Commission has just hired its first staff member. It remains to be seen what its impact will be on the many problems of water resource coordination.

The Massachusetts Water Supply Policy Study examines a number of basic issues which affect water pollution control planning as well as water supply. One of the most important problems is the inadequacy of the water resource data base. The report notes that standardized procedures for recording water usage do not exist, so that individual studies and plans are not comparable.*** Projections of future water use suffer from the inadequacy of current use data, from inconsistent methods of projecting population changes and from variations in methods of projecting per capita usage. The report concludes:

> In summary, the current status of water supply planning in Massachusetts is characterized by widely dissimilar regional projections, a lack of any meaningful statewide assessment of needs, and an absence of standard projection methodology.+

Other studies have pointed out the lack of basic data about water usage. A study commissioned by the Metropolitan District Commission on water usage in its service area found that unmetered water usage accounted for 38% of the total water supplied to MDC member communities. This contrasts with 32% of the total supplied that is consumed by all metered domestic users.* This report has led to controversy over how much of this "unaccounted-for" water can be attributed to legitimate uses, such as sewer flushing, street cleaning, and fire fighting, how much results from small unavoidable leaks at connection points and inaccurate consumer meters, and how much occurs through wastage through broken pipes or is stolen through illegal unmetered connections.

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*Massachusetts Water Supply Policy Study. 1977. p. 4.

**Ibid. p. 117.

***Ibid. p. 169

+Ibid. p. 171

The uncertainty about the fate of unmetered water in the MDC is indicative of the general level of ignorance about the flows of water in the Boston area water supply and wastewater systems. No good estimates of system water balance including consumption, leakage and supply, and infiltration/inflow have been made. Not only are significant percentages of water supply lost en route to consumers, but the wastewater flow to treatment plants appears to contain large percentages of infiltration from ground and ocean water. Until these questions are answered, it is difficult to see how accurate projections of future requirements can be achieved.

Projections of future water use are complicated by possible changes in policy. The Massachusetts Water Supply Policy Study notes than an effective water conservation program could have a significant impact on the demand for water. It notes that the Water Pollution Control Act encourages industry to reduce their water use in order to reduce pollution control costs.** Through education of both industrial and domestic consumers and through appropriate incentives, a savings of 15 to 20% of water use through the 1980's could be achieved.***The successful implementation of policies to reduce water consumption would contradict the basic demand assumptions used in all current water supply and wastewater treatment plans. For example, the EMMA plan assumes per capita consumption of water would increase one gallon per capita/day annually through the year 2025.+

These uncertainties about projections of water use make effective wastewater treatment planning difficult, as do the differences in the underlying projections of population and economic activities used in planning studies.

Massachusetts Growth Policy Study

Projections of growth and the distribution of economic activity have been the major focus of the Massachusetts Growth Policy Study. This study, coordinated by the Office of State Planning, attempted to gather data from communities on their preferences for growth, and then to use those preferences in designing policies for growth management. The Growth Policy Committees from the communities submitted completed Questionnaires to the Regional Planning Agencies, such as the MAPC, which then prepared regional reports; these regional reports formed the basis for the state report, which was distributed in September, 1977.* The recommendations of the state report with respect to water resources include:

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*Water Resources Research Center, University of Massachusetts. Water Usage Study in Communities Served by the Metropolitan District Commission. Curran Associates, 1975, p. 8.

**This has been strengthened by the 1977 Clean Water Act.

***Massachusetts Water Supply Policy Study. p. 187.

+Metropolitan District Commission. Eastern Massachusetts Metropolitan Area Study. Vol. 2: Engineering Criteria. Metcalf & Eddy, Inc. March, 1976. Assumptions of increasing per capita flows over the life of a facility are no longer permitted under P.L. 95-217.

- water conservation across the state;
- encouraging water self-sufficiency in communities;
- expansion of large districts such as the MDC only when a need is proven;
- reducing the size of proposed water pollution control facilities where conservation is achieved;
- providing more local control over wastewater facility sizing and location, and encouraging the use of non-structural solutions.

In essence, the approach to growth proposed in the report is to focus development on existing developed areas, which means attempting to solve existing water quality problems and to reduce the expansion of developed areas arising from extending water and wastewater service. However, a review of past grants in Table 3-3 shows no shift in funding from developing to existing areas -- if anything, the reverse is true -- and the proposed Priority List continues this allocation.**

The growth management proposals form a significantly different set of recommendations than that proposed by the SENE Study, although the water recommendations appear to have been coordinated with the Water Supply Policy Study. The ability of the state to implement these policies, however, is open to question: implementation requires agreement among a number of agencies on the overall direction for their individual programs. There are no requirements for implementing the recommendations of the SENE Study, and no incentives for the state's Growth Management Policy to coordinate with a largely independent effort. The more limited objectives shown by the Water Supply Policy Study (water conservation, coordinated through the Water Resources Commission) may be feasible; general coordination of all policies affecting growth in the Commonwealth will be more difficult.

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*Massachusetts Office of State Planning. City and Town Centers: A Program for Growth. Commonwealth of Massachusetts, September, 1977.

**Priority list criteria were revised after this study finished its data collection; it is not clear whether the revised criteria will affect this issue.

TABLE 3-3

ALLOCATION OF GRANTS AMONG TYPES OF COMMUNITIES* IN THE CASE STUDY AREA
($000)

	Older Urban Core	Older Cities	Inner Suburbs	Outer Suburbs	TOTAL
1975	---	5,250.0	8,993.3	111.9	14,355.2
1976	3,688.6	3,340.0	5,299.5	28,007.8	40,335.9
1977	16,781.8	7,340.4	33,908.7	18,990.7	77,021.6
TOTAL	20,470.4	15,930.4	48,201.5	47,110.4	131,712.7**

Source: Office of State Planning community classification
EPA Region I Grant List, Fiscal Years 1975-77

*Calculations excluded grants to the MDC.

**Totals may not equal total allotment for these communites due to rounding.

3.2 COORDINATING PLANS AT THE LOCAL LEVEL

While master plans may attempt to consider all issues on a grand scale, implementation occurs through decisions made about specific projects in individual locations. Therefore, it is necessary to coordinate the detailed interactions of programs in the later stages of planning. This is the purpose of A-95 (or clearinghouse) review, which attempts to promote "...coordination of direct Federal development programs and projects with state, areawide, and local planning..."* The circular provides procedures for the project notification and review system, and the sorts of comments which are expected through the clearinghouse review.

Local comprehensive planning and coordination can occur through A-95, or through other channels.

The A-95 Process for Wastewater Projects in the Boston Area

Clearinghouse review is required for each step in the facilities planning process, and for the plans prepared under section 208. In Massachusetts, the state clearinghouse is the Office of State Planning, while the MAPC forms the regional clearinghouse. Wastewater projects are reviewed within state government by the Historical Commission, the DEQE, the Environmental Review Office of EOEA, the Department of Public Works, and the Coastal Zone Management office (where applicable). Pertinent portions of plans are copied by OSP and sent to the various reviewers, with the full documentation available for inspection.

At the MAPC, 201 projects are reviewed primarily by the staff of the 208 project, and it is only rarely, if at all, that people concerned with other programs review wastewater projects.

Sewer projects are reviewed at the state level for their effects of growth, traffic, and environmental impacts, since those are the areas of interest of the agencies involved. The comments rarely lead to changes in the plans unless there is already local controversy about the proposed facility. In most cases, comments are limited. However, they may be ineffective even when they are made: in a number of cases, for example, the Department of Public Works has prepared comments questioning growth assumptions in wastewater facilities plans. These have had no apparent effect on the plans in question, according to our interviews. The review at the regional level is equally ineffective and seldom even looks at the relationship of sewers to housing and transportation.

In addition, the A-95 process is used in gathering state and local comments on projects for which Environmental Impact Statements are prepared. Comments on EISs are discussed further in chapter 6.

Review of Projects by Wastewater Agencies under A-95

While proposed wastewater projects may have an effect on other aspects of metropolitan development, other projects may also affect wastewater management, and water quality. Therefore, it would appear that the A-95 process would include circulation of relevant project descriptions to water and wastewater agencies such as the Water Resources Commission, the staff of the 208 project within MAPC, and DWPC.

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*Office of Management and Budget. Circular A-95, revised, On Evaluation, Review, and Coordination of Federal and Federally Assisted Programs and Projects. January 13, 1976.

This seldom happens. Agencies are chosen by OSP for their functional interest in particular projects or programs, so that DEQE review is likely to consider required permits and environmental impacts. With multi-purpose agencies, the same is true: for example, at MAPC, the staff of the 208 project has reviewed only wastewater projects under A-95 with other types of projects going to other reviewers. While any concerned agency can request receipt of the A-95 monitor list, the types of projects reviewed by each agency rarely varies. Thus, the role of A-95 in the analysis process seems to be limited to the major, short-term direct impacts.

Public Participation for Local Comprehensive Planning

One alternate route for comprehensive planning of local projects is the use of public participation. For example, the Ipswich River Watershed Association was formed at least partially as the result of public participation efforts under the 208 project, and has commented primarily on issues such as water supply and control of growth, which have not been addressed in any depth by the 208 study. As shown in the following chapters, public participation has generally been directed at increasing the comprehensiveness of planning, and at the inclusion of other issues besides wastewater management. This has been particularly true in the planning of individual projects at the local level.

Informal Modes of Coordination

Coordination tends to occur on large-scale projects with multiple requirements, because everyone has an incentive to make the project succeed. A good example of this is the coordination of sewer rehabiliation in Boston with the redevelopment of the Southwest Highway Corridor. Transportation officials have worked with wastewater officials in the MDC, EPA, and other state agencies to develop plans for the rehabilitation of sewers simultaneously with the earthwork for Southwest Corridor development. The result of this coordination was a joint memo from EPA and DOT, and an apparently successful example of joint development.

Coordination also occurs when land is in short supply, and conflicts between uses exist: the experience at Deer Island provides a good example. Here, court action on one governmental program made last-minute joint planning and coordination necessary.

In 1975, Suffolk County (which includes all of Boston, Quincy, Chelsea and Revere) was placed under Federal court order to close a correctional facility. The County proposed expansion of the Deer Island House of Correction as an alternative, with extended newspaper coverage of the deliberations and court actions. The judge in the case suggested that the state should issue a policy on coordinating prison development with on-going wastewater treatment facilities. At that point, the Executive Office of Environmental Affairs and the EPA Regional Office became involved, as EOEA submitted materials on the proposed expansion of both treatment facilities and parkland on the Island. The Federal District Court concluded that environmental improvement was of equal concern with the rights of prisoners, and requested that the Commonwealth develop a coordinated program. A task force was set up to consider the conflicting demands, which included an MDC park on surplus Federal land, the expansion of the Deer Island Treatment Plant to provide secondary treatment, prison expansion, and the relation of Deer Island to the Harbor Island State Park, which is being developed by the Department of Environmental Management. This Task Force recommended use of the area for the treatment plant and parkland, though the issue is not fully resolved.

Compensation has been a continuing issue in these deliberations, with the city stating that it is unable to afford to move its prison elsewhere, and the MDC finding purchase of the property to be an unreasonable expense. The Clean Water Act of 1977 contains a provision which allows the Federal government to pay up to $15 million towards purchase of the Deer Island House of Correction, for the purposes of constructing a secondary treatment facility on the site. There are other successful cases of detailed coordination with respect to individual sites, and a growing movement towards recreation planning in proximity to wastewater facilities, which is being supported in Region I through the actions of full-time EPA staff. While approaches like these are not comprehensive, they combine with the A-95 review process to result in some planning and program coordination for the various individual projects.

3.3 CONCLUSIONS AND RECOMMENDATIONS

The Nominal Process

Water quality management planning as established by P. L. 92-500 assumes a hierarchial structure, with planning starting at the top in the broad "Level B" studies, and proceeding in successive steps through more detailed regional studies to the design of local projects. Opportunities for master planning, or the coordination of water quality goals with the goals of other environmental and social programs are greatest at the broadest and smallest levels: the "Level B" studies and local facilities plans. The Level B studies analyze existing conditions in a large geographical area and set goals for water quality management. Here, the goals of water resource programs, recreation , land use, and other functional areas should be coordinated so that planning can proceed rationally in each. At the end of the water quality planning process, another opportunity for coordination arises when plans are specific enough to enable a detailed assessment of impacts on these other programs and goals.

Problems arise when goals are set at the broadest planning level but are not implemented in the following planning studies. If each succeeding study sets its objectives without relating them to the broader analyses, coordination mechanisms provided at the end of the planning process may not afford sufficient control to ensure that needs identified at the start will be fulfilled.

The Case Study

In Boston, comprehensive planning efforts like SENE have appeared to be productive: the participants have felt that the studies are important, and they generated major reports and considerable interest among planners and activists. However, they have not had an immediate effect on the operations of the individual programs. SENE performed a detailed analysis of existing and future conditions in the study area, with extensive public participation. However, no agency or public body has been able to implement SENE's recommendations; there does not even seem to be any pressure for their implementation at present.

There is little coordination of data bases between the various levels of planning, for the simple reason that it is often easier to develop new data than to adjust existing data sets to meet new needs. MAPC, for example, used some of the SENE data, but in doing so, it was necessary to revise scales and assumptions. The SENE data base became only one of a number of sources of secondary data about the region. Data that are accurate for planning on a large scale may not be precise enough for more detailed local planning efforts.

At the other end of the scale, the A-95 review process for wastewater facilities is not comprehensive, and has not resulted in the use of information generated in one program for planning in another: few programs even see the plans of others, through A-95. At best, A-95 review of wastewater facilities enables assessment of direct environmental impacts. It does not lead to any coordination in the sizing or location of public investments; nor are the results of other planning studies and programs included in the wastewater plans through A-95 review.

In the Boston area, alternative channels supplement the designated A-95 review. A-95 does ensure that every project is reviewed to some degree, and this appears to provide a minimum level of coordination, supported by the less formal methods. Specific efforts at coordination for individual projects and sites appear to occur outside of the A-95 process, but seem to be effective in enabling decisions to be made.

Recommendations

Even given their problems, we believe that SENE and other master planning efforts should be continued and that they should probably be expanded in the areas of issue identification and goal setting. Large-scale analysis and decision-making is an important step in the process; it has the potential to color all later activities. For example, SENE focused on critical areas, recreation benefits, and other impacts of water quality management actions. It is clear that these regional concerns should affect the later stages of planning, to provide an areawide context for more detailed analyses. As will be seen in chapters 4-6, this has not always occurred in the Boston area. The areawide studies have taken SENE's recommendations individually, and used them out of context, reducing their impact significantly. The following studies have also tended to start again at goal formulation. For large-area analysis such as SENE to have an impact on further planning, it is necessary to tie the issues identified in the broad studies to the work programs of the areawide agencies, and we recommend Federal efforts in this direction.

At the detailed level, A-95 review does not appear to be very effective in ensuring that coordination occurs among projects, or that individual projects are modified in accordance with the needs of other agencies. However, coordination does occur through a number of informal channels on the major projects. A-95 makes sure that some review is given to every project, and provides a procedure where significant problems will be notices. Other methods provide actual coordination for these problems, whether noticed through A-95 or through other channels. While this process is not fail-safe, it appears to work in the cases analyzed, and we see no need to recommend changes at this time.

CHAPTER 4

REGIONAL WASTEWATER MANAGEMENT PLANNING

Before the passage of the 1972 Amendments to the Federal Water Pollution Control Act, planning for wastewater treatment was done primarily by local agencies and sewer boards (and by their consulting engineers) as a prerequisite for obtaining federal subsidies for the capital costs of constructing sewage collection systems and treatment plants. The involvement of the federal government was limited to grants disbursement, although planning requirements became increasingly more detailed with each set of amendments to the original Federal Water Pollution Control Act of 1956. The agencies doing the planning were the administrative units that expected to receive the funds for construction of the collection and treatment systems.

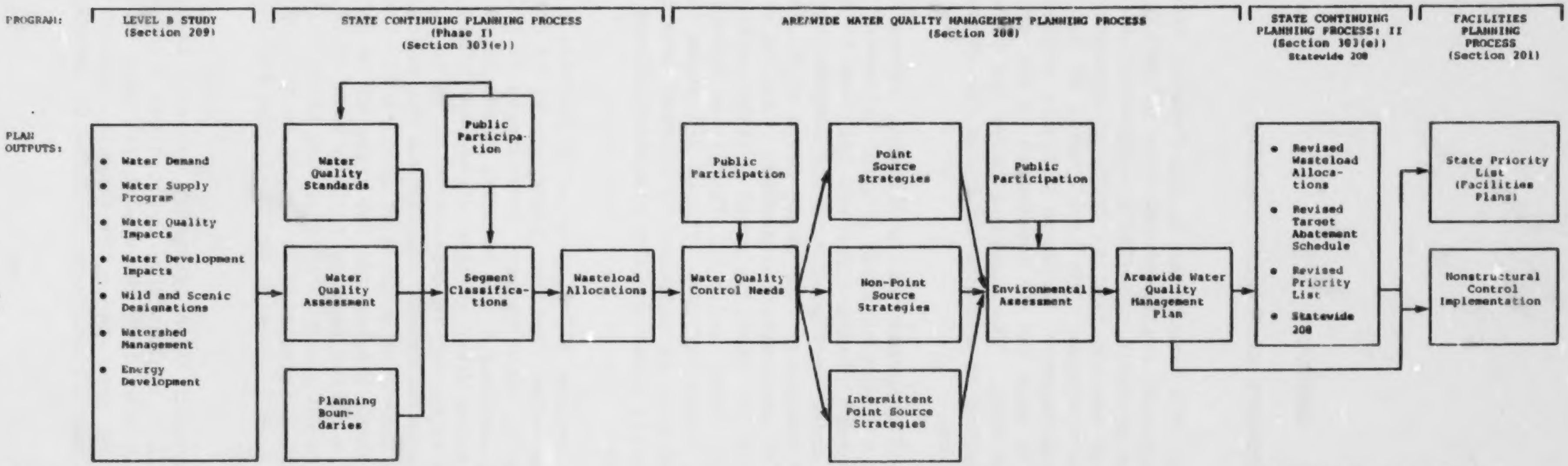
With the passage of the 1972 Amendments, additional layers of planning were imposed upon what had been almost entirely a local process. The 1972 Amendments established a four-part planning process that was to start with "Level B" plans (established under Section 209 of the Amendments) and proceed through two types of regional planning: the state basin planning program under section 303(e) and the areawide wastewater management planning program under section 208. Finally, remedies for specific water quality control problems were to be analyzed at the local level under the facilities planning process portions of the Construction Grants Program. Figure 4-1 shows the process by which wastewater treatment planning is supposed to proceed from the state basin planning program and the areawide water quality planning process to the facilities plans at the local level.

The primary role of the section 303(e) plan is to provide a statewide analytical base from which the other regional plans are to be developed. The state basin plans are to develop water quality inventories of pollution loads in each segment of the basin, and goals for reducing these loads where they do prevent the attainment of existing water quality standards. Four major elements are to be considered for each segment: an assessment of total daily waste loads, targets for wasteload allocations, effluent limitations for individual point sources, and an assessment of non-point sources of pollution. The classification of existing water quality in these streams and the goals to be met by each segment are to be the subject of a public hearing held on each basin plan. The information contained in these basin plans is to form the technical water quality basis for the areawide management strategies developed by the 208 projects, and for the effluent limitations used to develop NPDES permits for individual dischargers in each basin.

In Massachusetts, the section 303(e) planning is being carried out by the state's Division of Water Pollution Control. Our concern with this type of planning lies with its role in providing the analytical base from which the other regional plans were to be developed. For example, the wasteload allocations developed in the state basin plans were intended to become the framework

Figure 4-1

MANDATED REGIONAL PLANNING RELATIONSHIPS


PROGRAM:
LEVEL B STUDY (Section 209)
STATE CONTINUING PLANNING PROCESS (Phase I) (Section 303(e))
AREAWIDE WATER QUALITY MANAGEMENT PLANNING PROCESS (Section 208)
STATE CONTINUING PLANNING PROCESS: II (Section 303(e)) Statewide 208
FACILITIES PLANNING PROCESS (Section 201)
PLAN OUTPUTS:
Water Demand
Water Supply Program
Water Quality Impacts
Water Development Impacts
Wild and Scenic Designations
Watershed Management
Energy Development
Water Quality Standards
Water Quality Assessment
Planning Boundaries
Public Participation
Segment Classifications
Wasteload Allocations
Public Participation
Water Quality Control Needs
Point Source Strategies
Non-Point Source Strategies
Intermittent Point Source Strategies
Public Participation
Environmental Assessment
Areawide Water Quality Management Plan
Revised Wasteload Allocations
Revised Target Abatement Schedule
Revised Priority List
Statewide 208
State Priority List (Facilities Plans)
Nonstructural Control Implementation

	LEVEL B STUDY (Section 209)	STATE CONTINUING PLANNING PROCESS (Phase I) (Section 303(e))	AREAWIDE WATER QUALITY MANAGEMENT PLANNING PROCESS (Section 208)	STATE CONTINUING PLANNING PROCESS: II (Section 303(e)) Statewide 208	FACILITIES PLANNING PROCESS (Section 201)
PLANNING AREA:	Southeast New England	All River Basins in Massachusetts	Boston Metropolitan Area (Metropolitan Area Planning Council)	All River Basins in Massachusetts	Individual Communities
TIMING:	(See Chapter 3)	120 days after Passage of P.L. 92-500: State Strategy Updated Annually	Two Years from Grant Award, Updated Annually after Certification	Updated Annually	(See Chapter 5)
AGENCY RESPONSIBLE:	New England River Basins Commission	Massachusetts Division of Water Pollution Control	Metropolitan Area Planning Council	Massachusetts Division of Water Pollution Control	Massachusetts Department of Environmental Quality Engineering, and Communities

for the areawide planning. The efficiency of this planning process in establishing and maintaining water quality standards for streams in the state is treated in other portions of the Interagency Boston Case Study.

The Division of Water Pollution Control is developing these plans in at least two phases. The first phase, which covers the preliminary assessment of point source discharges into streams and identifies segments which do not meet the state's water quality standards, is almost complete. Phase I basin plans have been published for several of the streams in the Boston Case Study area: the Charles River (upstream from the Watertown Dam), the SuAsCo basin, the Ipswich River and the North River. Phase I basin plans will not be prepared for the other rivers that are tributaries to Boston Harbor (the Charles River Basin, the Neponset and Mystic Rivers, and tributaries to Weymouth Harbor), for reasons that will be discussed below. Phase II revised plans will incorporate the non-point source identification and control strategies developed in the 208 plans (where these elements have been adopted by the towns and certified by the state). A status report on each basin will be developed by November 1, 1978* (the data by which the 208 plans are to be certified), and the Phase II basin plans will be developed as soon after that as possible.

The responsibilities of the 208 planning program are broad, since it must develop intermittent and non-point source control strategies as well as strategies for point source controls on an areawide basis. The 208 plan is also supposed to contain a schedule for the construction of facilities under the section 201 programs, and to set up management strategies for the implementation of the 208 plan recommendations. In addition, the 208 planners are to take a "multi-media" approach to the development of these management strategies: for example, they are to evaluate the impacts of wastewater treatment alternatives and coordinate with planning under the Clean Air Act and Coastal Zone Management Act. The 208 program was originally funded for a period of two years, but limited funding has become available to add an additional year to the program. In Region I, these funds are to be used primarily for implementation of the recommended management alternatives, while national guidance indicates that some planning activities will also be acceptable.

The state Continuing Planning Process and the areawide water quality management planning are iterative, since the outputs of one program become the inputs to the next phase of the other (see Figure 4-1). Elements of the areawide plans are to be incorporated directly into the state's Continuing Planning Process as they are certified. In addition, both plans are to be updated on an annual basis once they are approved in their original form.

This chapter focuses on the interrelationships between the two types of areawide planning established by the 1972 Amendments, and on the ways in which these plans (and related planning efforts such as the EMMA Study) have identified problems and proposed solutions at the regional level. Section 4.1 looks at the Federal role in the actual planning process, including issues such as the timing of grants and guidance, and the effects of federal requirements on what is considered areawide planning. Section 4.2 then analyzes coordination among the various areawide plans at the state level, including the state Water Quality Management plans, the 208 plans, and the EMMA study, while Section 4.3 analyzes public involvement in regional planning. Section 4.4 provides an initial look at the effect of the regional plans on the local planning process; this relationship is described further in Chapter 5. Finally, Section 4.5 provides our conclusion about this stage in the overall wastewater management process and our recommendations.

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*This deadline has been extended to July 1, 1979 since publication of the draft report.

4.1 THE INFLUENCE OF FEDERAL ACTIONS ON REGIONAL PLANNING IN BOSTON

The timing of implementation of the regional planning provisions of P.L. 92-500 has had a major impact upon the efficiency of these programs in carrying out their goals. The planning was funded much later than the schedule established by P.L. 92-500, and there was also a delay in developing regulations and guidance for preparing the areawide plans. The delay in funding meant that the facilities planning at the local level preceded much of the regional planning efforts mandated by P.L. 92-500. The delay in the promulgation of guidance materials has meant that goals (and thus expected outputs) of the planning process changed after grant awards were made, resulting in a certain amount of confusion.

Timing of Funds

The areawide planning program in the Boston region did not get underway until summer, 1975 and is scheduled to be complete by November 1, 1978. While the areawide planning was being set up, many communities prepared step 1 plans in anticipation of receiving the construction grants as the funds were released. According to guidlines published by EPA, these on-going facilities plans were to be taken as predetermined for the 208 project efforts. In effect, a large part of the study area was removed from an analysis of alternative wastewater treatment solutions (including non-structural controls) because of the delay in 208 start-up.

The overall impact has been to reduce the scope of the 208 planning process in the Boston area, and to complicate the 208 agency's relations with its member communities.

Timing of Guidance

A second national problem has been the delay in developing regulations for the areawide planning process. While many 208 agencies were awarded grants in the spring of 1975 (ten areawide agencies started work in 1974 under a demonstration program), interim regulations for the 208 program were first published in the Federal Register in August, 1975, and final regulations were not adopted until December, 1975. By this time, the MAPC Water Quality Project had been in operation for fully one quarter of the time allocated for plan preparation and approval (six months). Figure 4-2 indicates the relationship between the publication of guidance on planning requirements and the local agency's schedule of outputs. It is interesting to note that the interim regulations and draft guidelines for the program were not available until shortly before MAPC's Project Control Plan (PCP) was to be submitted. The Project Control Plan was substantially revised and resubmitted the following March. The entire project staff was involved in preparing the first draft, and parts of the second, so the net effect was to delay the actual planning work for several months. This delay became crucial later on in the two year program.

The final regulations for the 208 program (40 CFR 131) clearly define the planning elements required of an areawide plan, as shown in Table 4-3. However, regulations in and of themselves rarely suffice for any large program, much less for a planning program of this magnitude. Guidance on the development of work plans, technical elements of the planning process and requirements for additional

Figure 4-2

ACTUAL REGIONAL PLANNING RELATIONSHIPS

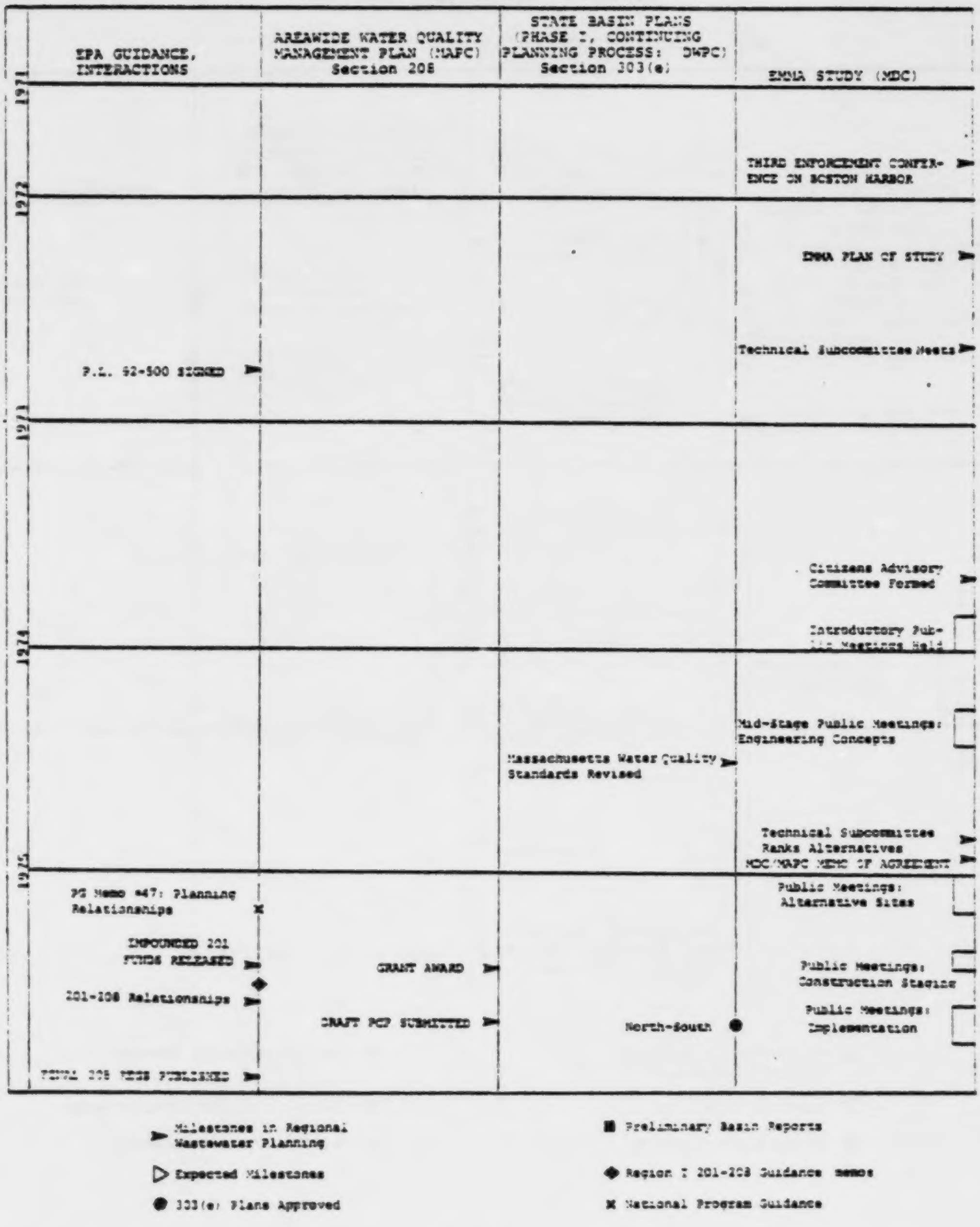
EPA GUIDANCE, INTERACTIONS
AREAWIDE WATER QUALITY MANAGEMENT PLAN (MAPC) Section 208
STATE BASIN PLANS (PHASE I, CONTINUING PLANNING PROCESS: DWPC) Section 303(e)
EMMA STUDY (MDC)
1971
1972
1973
1974
1975
THIRD ENFORCEMENT CONFERENCE ON BOSTON HARBOR
EMMA PLAN OF STUDY
Technical Subcommittee Meets
P.L. 92-500 SIGNED
Citizens Advisory Committee Formed
Introductory Public Meetings Held
Mid-Stage Public Meetings: Engineering Concepts
Massachusetts Water Quality Standards Revised
Technical Subcommittee Ranks Alternatives
MDC/MAPC MEMO OF AGREEMENT
PG Memo #47: Planning Relationships
Public Meetings: Alternative Sites
IMPOUNDED 201 FUNDS RELEASED
GRANT AWARD
Public Meetings: Construction Staging
201-208 Relationships
DRAFT PCP SUBMITTED
North-South
Public Meetings: Implementation
FINAL 208 REGS PUBLISHED
Milestones in Regional Wastewater Planning
Expected Milestones
303(e) Plans Approved
Preliminary Basin Reports
Region I 201-208 Guidance memos
National Program Guidance

Figure 4-2

ACTUAL REGIONAL PLANNING RELATIONSHIPS (Continued)

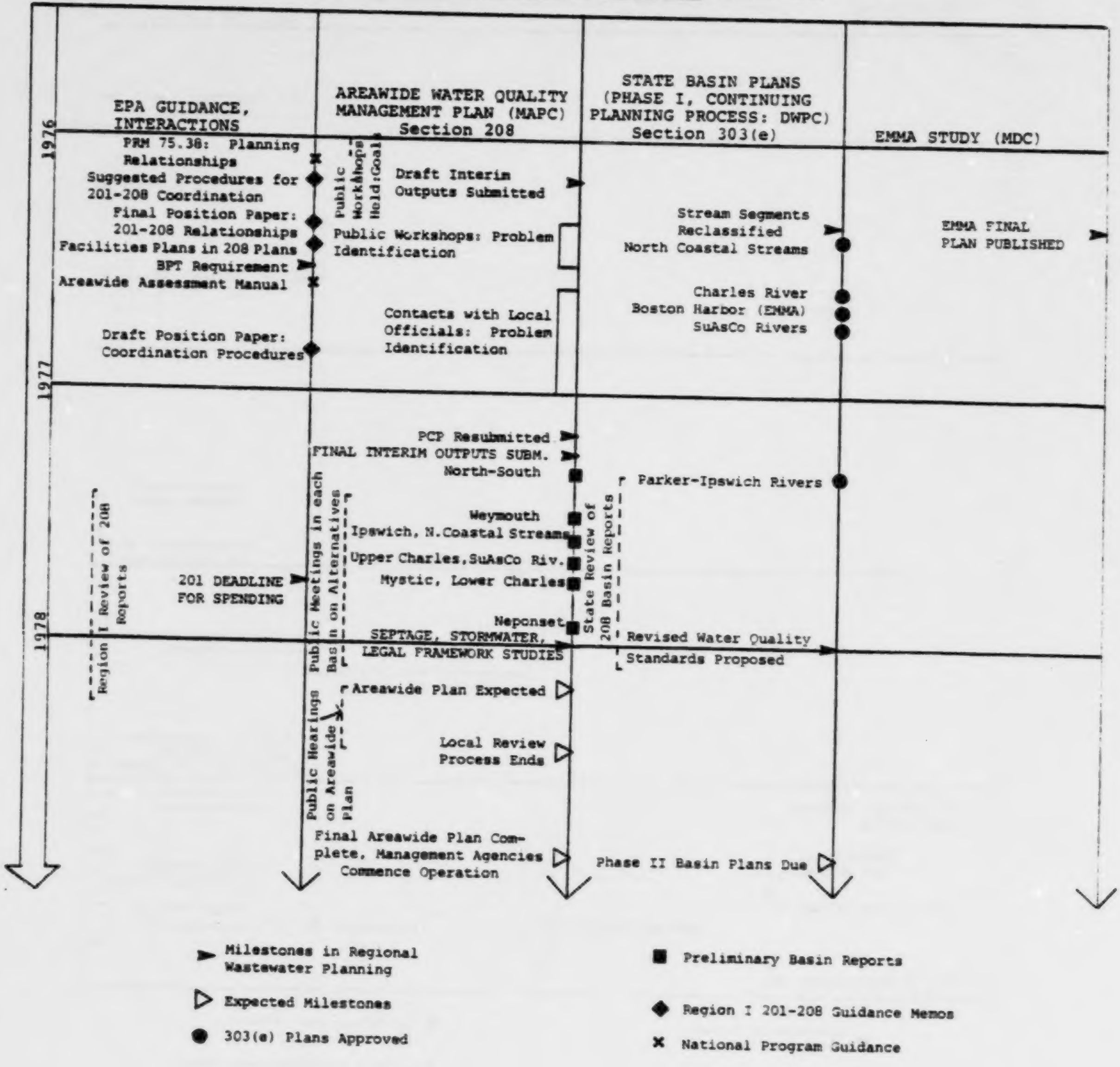
EPA GUIDANCE, INTERACTIONS
AREAWIDE WATER QUALITY MANAGEMENT PLAN (MAPC) Section 208
STATE BASIN PLANS (PHASE I, CONTINUING PLANNING PROCESS: DWPC) Section 303(e)
EMMA STUDY (MDC)
1976
1977
1978
PRM 75.38: Planning Relationships
Suggested Procedures for 201-208 Coordination
Final Position Paper: 201-208 Relationships
Facilities Plans in 208 Plans
BPT Requirement
Areawide Assessment Manual
Draft Position Paper: Coordination Procedures
Public Workshops Held:Goals
Draft Interim Outputs Submitted
Public Workshops: Problem Identification
Contacts with Local Officials: Problem Identification
Stream Segments Reclassified
North Coastal Streams
Charles River
Boston Harbor (EMMA)
SuAsCo Rivers
EMMA FINAL PLAN PUBLISHED
PCP Resubmitted
FINAL INTERIM OUTPUTS SUBM.
North-South
Weymouth
Ipswich, N.Coastal Streams
Upper Charles,SuAsCo Riv.
Mystic, Lower Charles
Neponset
SEPTAGE, STORMWATER, LEGAL FRAMEWORK STUDIES
Parker-Ipswich Rivers
Public Meetings in each Basin on Alternatives
State Review of 208 Basin Reports
Region I Review of 208 Reports
201 DEADLINE FOR SPENDING
Revised Water Quality Standards Proposed
Areawide Plan Expected
Public Hearings on Areawide Plan
Local Review Process Ends
Final Areawide Plan Complete, Management Agencies Commence Operation
Phase II Basin Plans Due
➤ Milestones in Regional Wastewater Planning
▷ Expected Milestones
● 303(e) Plans Approved
■ Preliminary Basin Reports
◆ Region I 201-208 Guidance Memos
✖ National Program Guidance

Table 4-3

AREAWIDE WATER QUALITY MANAGEMENT PLANNING ELEMENTS

Elements Established in Regulations (40 CFR 131.11)

--Planning boundaries
--Water Quality assessment, segment classifications
--Inventories and projections
--Non-point source assessment
--Water quality standards
--Total maximum daily wasteloads
--Point source allocations
--Municipal waste treatment systems
--Industrial waste treatment systems
--Non-point source control
--Residual waste control needs
--Urban industrial stormwater needs
--Target abatement dates and compliance schedules
--Regulatory programs
--Management agencies
--Environmental, social and economic impacts
--Public participation

Elements Required by Region I

--Wastewater treatment facilities
--Combined sewer overflows
--Industrial pre-treatment
--Sludge and septage disposal
--Land use limitations for water quality, including zoning limitations
--Non-point source control
--Laws and regional arrangements
--Interim outputs scheduled for March, 1976

- service areas
- construction priorities
- projected population and land use
- projected wasteloads and flows
- revisions to wasteload allocations, NPDES permits and industrial discharges to municipal system
- plan implementation mechanisms and institutions

--River constituency
--10% of budget for public participation
--Environmental assessment
--Adequate resources and time for implementation
--Written state approval
--Coordination with state and local agencies
--An advisory committee

plan elements continued to be developed, both in EPA Headquarters and in the EPA regional office, which became the clearinghouse for transmitting national policy to the areawide agencies. Thus, the national policy on 208 planning became further refined.

In New England, the Region I EPA office has modified and interpreted the national policy to make it directly applicable to the political situation that is peculiar to these states. The Region I office's priorities for planning elements to be included in PCPs are also shown in Table 4-3. It should be noted that the priorities are directed at the final plans, while the national regulations include the basic water quality inventories. The Region I office has felt the need for additional guidance on a wide range of issues confronted by the areawide planning agency. A search through the guidance memos issues to 208 agencies by Region I since 1975 provides the following examples, among others:

- coordination between 208 and 201 planning (discussed below);
- combined sewer overflows (August, 1975);
- numerous memos on suggested approaches to 208 planning, including one on industrial pretreatment (August, 1975);
- the relationship between local communities and the 208 program (September, 1975);
- the citizen participation process and the development of a "river constituency" (September, 1975);
- Bypass/overflow studies and evaluations (February, 1976);
- Basic approaches for non-point source control studies (February, 1976);
- Region I policy for the use of multi-levels of advanced waste treatment (October, 1976);
- Toxic pollutants (February, 1977);
- 208 plans and real water uses (March, 1977);
- Septage treatment and disposal (March, 1977).

In addition, the regional office developed several draft position papers on such topics as "Alternatives to Conventional Centralized Wastewater Treatment Facilities" and "Growth Projections for the Design of Sewerage and Centralized Wastewater Treatment FAcilities." EPA's National Areawide Assessment Procedures Manual was finally issued in July, 1976. The list of planning elements considered by the 208 program may not even be completed yet -- at a time when the program is supposed to be moving toward implementation of its recommendations.

Many of these guidance materials have been directed toward the data collection and analysis efforts that should have been carried out during the first year of the 208 process. For example, the Region I draft position paper on growth projections was not published until November, 1976, while interim outputs containing population and economic projections were due to be submitted to EPA eight months earlier. Guidance on this subject was at least untimely, if it was useful at all to the agencies that were responsible for developing the projections.

The cumulative effect of these guidance papers has been to continually modify the rules of the planning process. An example of this can be found in the memo issued in February, 1977 which added an inventory of toxic problems and sources to the 208 scope, nearly two years after project initiation. Another example is the requirement for identifying actual uses of streams in the planning area. While the requirement seems to be quite reasonable, the fact that the guidance was not published until March, 1977 is not. These examples and others show that EPA has regularly revised its guidance on the work to be performed by the 208 agencies, resulting in shifts in emphasis and methodology throughout their history. According to numerous interviews, this has resulted in wasted effort in the 208 agencies, and reduced planning efficiency.

Local Issues

In addition, the regional office has emphasized local needs and problem identification, and the need for detailed description of solutions as they apply to each member community. The stated reason for this approach is that New England's Town Meeting form of government means that each community has to be intimately involved in the planning process if anything is to be implemented. The regional guidance* for the 208 recommendations indicates that these recommendations must indicate to a community how exactly their ordinances need to be changed and how this change should be brought about. As a result, the MAPC has been concerned with preparing detailed recommendations for individual towns. The MAPC Draft Basin reports address the needs on a town-by-town basis, with little concern for areawide issues. EPA has stated that "the region is a nonentity as far as implementation is concerned,"** but river basins are important on a hydrologic basis. The emphasis on local concerns seems to exclude consideration of these regional issues that are the raison d'etre for the planning being done by a regional agency.

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*Memo prepared by EPA Region I, "Level of Detail and Specificity of Draft Plans," June 7, 1977.

**In a memo published in July, 1977 by Region I on the review and approval process for the areawide plans being developed, the regional policy is made clear:

> "The number one concern for all 208 plans is likely to be the level of detail and specificity. ...Put yourself in the position of a local citizen or official who would like to find out what specific actions need to be taken by his community, how he will benefit, and how much it will cost. Remember, a region is a nonentity as far as implementation is concerned. If the local governments don't clearly know what has to be done, how will it be accomplished? Specific recommendations are absolutely essential for those issues that have been identified as priority by the 208 agency".

Emphasis on Implementation

There has also been a major emphasis in Region I on implementation. EPA's concern with management agencies, implementation of plans, and similar issues was intended to make the 208 plans more practical than earlier attempts at areawide planning.

In October, 1975, a memo indicated that:

> "It is essential that during the last three to six months of the initial planning process, concerted efforts be made to build a solid foundation for implementation which can serve as the basis for continuing efforts...this implies that all of the major planning activities should be completed at least three months before the end of the initial planning process."*

In another memo on "Regional Guidance and Approval of 208 Plans, the Regional Office states that approval of the proposed management system will be based on whether that "management system is currently in place and operative, (and whether) it is adequately funded and staffed and effectively accomplishing its objective."** Requirements have also been placed on implementatkon as a basis for continuing funding. The national guidance on third-year funding indicates that the agency must have been successful in its 208 work to date to receive such funds. A memo distributed by Region I outlines criteria for this third year funding: one prerequisite is "documentation of implementation accomplishments during the two-year planning process."***

Many planning studies in the past have failed because of lack of mechanisms for implementation, and this is clearly the reason for EPA's emphasis. However, as will be shown below, the emphasis has been premature in the Boston area, and may result in less implementation, or in implementation only of the easiest (and, perhaps, least important) aspects of areawide planning and water quality management.

Effects on MAPC Performance

The Region I activities on 208, then, have involved continuing changes in the requirements, methodologies, and planning activities; an emphasis on preparing information useful to the individual communities as the major vehicle for implementation; and, a concern that implementation be demonstrated in the first two years of planning. To some degree, the changing requirements, and the emphasis on implementation in an already short planning period has constrained the ability of the 208 agencies to plan on an areawide basis.

MAPS's response to these constraints is shown in its draft documents and the public reaction to them. These draft plans have been developed for each basin, but are primarily directed at the options available to the individual communities. They were based heavily on secondary data, reportedly because of time and resource constraints. Contact with the towns came through staff interviews with various community representatives, and interviews conducted by one of the agency's consultants with town boards of health. Information gained from these primary sources was frequently conflicting; this problem was compounded by the relatively long period of time that elapsed between data gathering efforts and the publication of preliminary basin reports. Time and resource constraints tended to discourage detailed coordination with all 92 communities. As a result, the preliminary basin reports attempted to provide for local solutions, without a consensus on local problems, data base or preferences.

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*Memo prepared by EPA Region I, "Implementation of 208 Plans," October 20, 1975.

**Memo prepared by EPA Region I, "Regional Guidance and Approval of 208 Plans," July 8, 1977.

***Memo prepared by EPA Region I, "Implementation Funding, April 15, 1977.

The communities have reacted strongly to these draft plans, with the Town of Acton providing the most detailed response. The MAPC plan suggests three construction alternatives for wastewater facilities in Acton, based on limited data on soils and performance. In its response, the town rejected these alternatives, and presented a detailed critique documenting new data, errors in fact, and errors in the reports' conclusions.* It also developed a fourth alternative for the area, emphasizing non-structural alternatives.

Comments from some other communities, while not as detailed, have been similar: many of the areas have documented data limitation in the MAPC work, and several have rejected the conclusions as either wrong or inappropriate.

While the Basin Reports have concentrated on alternatives for structural solutions for individual communities and problem areas, areawide considerations have been analyzed in separate reports, if at all. Septage and stormwater management have been the subject of other reports, which have not been included in the draft Basin Reports. Water quality has reportedly been the basis for identification of problem areas, but this is not demonstrated in the reports. In essence, the Basin Reports provide suggestions on facilities for individual communities, with only limited suggestions on land use, non-point source control, and other issues affecting the basins as a whole. **

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*Town of Acton, "Comments on the MAPC Preliminary Water Quality Report for the SUASCO Basin," October, 1977. See also

R. Sherman, "Critique of SUASCO Basin Preliminary Report (208)" prepared for the Acton Planning Board, October, 1977.

**The Draft Areawide Water Quality Management Plan, published in April, 1978, went a long way towards correction of some of these problems. The septage, stormwater and legal/institutional elements that had been prepared separately from the preliminary Basin reports were formally incorporated into the draft plan. A package of non-structural controls was presented for suburban communities, and many of the community representatives that had most vociferously objected to alternatives as outlined in the Basin reports participated in developing these strategies. However, the fact remains that these plan elements were not available when they would have been most useful to the 208 staff and to these communities--when alternatives were being developed and an initial screening was taking place.

4.2 COORDINATION OF NEW AND ON-GOING AREAWIDE PLANNING

In the Boston area, implementing the planning requirements of P.L. 92-500 was complicated by the existence of another plan that is regional in scope but intended to answer questions more appropriate to a facilities plan. This is the EMMA Study, a comprehensive engineering and management study of the entire Metropolitan Sewerage District, which was undertaken jointly by the MDC and the Corps of Engineers. The study arose from the recommendations of a series of Enforcement Conferences held under the auspices of the Federal Water Pollution Control Administration to deal with water quality conditions in Boston Harbor and its tributaries.* The initial planning area covered 109 communities in Eastern Massachusetts. Work focused upon communities which were members of the MSD and those towns which the planners felt would be likely to join the District.

EMMA planning was focused on the question of the appropriate size and level of service for the MSD, and was meant to be preliminary to specific facilities plans. The Plan of Study was primarily dictated by the findings of the third Enforcement Conference. Funding for the study came from the Commonwealth of Massachusetts through appropriations for the MDC and from the Federal government, through the Corps of Engineers. A technical Subcommittee with representatives from EPA, the MDC, and other concerned State agencies, was set up to supervise the planning. A Citizen's Advisory Committee (CAC) was also formed to provide public input.

While the EMMA Study did not receive funds under the 1972 Amendments, the 1971 Plan of Study did include elements that would enable the MDC to meet its obligations for construction grants under the new legislation, and that would greatly aid the 208 program with data on point sources problems in the greater Eastern Massachusetts region. Examples included a preliminary evaluation of plans for additional treatment at the MSD's two treatment plants, development of an industrial waste survey and preparation of an ordinance to control industrial wastes. The Plan of Study also included a public participation element, something which had never been undertaken in previous wastewater studies in the area. EPA's participation in the Technical Subcommittee was directed at ensuring that compliance with EPA policies did not pose a problem to the progress of EMMA.

Coordination of EMMA with the 208 Process

In 1975, when the 208 process was beginning in the area, the MDC was concerned that the EMMA effort not be wasted, and that the agency continue to have control over the structural alternatives in its service district. The MDC was prevented by EPA regulations from becoming the designated 208 agency for the area, since its commissioners are state appointees, rather than representatives of the member towns. However, one of the requirements for the 208 agency was a letter of intent from affected communities,** and this was interpreted by the state to include special districts such as the MDC. As a result, the MDC had to be satisfied before the MAPC could be designated as the 208 agency.

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*See the Kennedy Engineers Phase II Report for a historical summary.

**40CFR 130(3).

A Memorandum of Agreement was prepared by the MDC and MAPC, which required that the EMMA plan be incorporated into the Areawide Water Quality Management Plan for the Boston area, as its recommendation for control of point-sources of pollution.

While the Memorandum of Agreement relieved the 208 agency of a burden to develop a large amount of information about almost half the communities in its designated area, it also established a large constraint on that planning effort. The regulations on 208 planning elements* call for the plan to be developed on the basis of point and non-point source wasteloads on each segment of each river basin at five year intervals over the twenty year planning period. The assessment of needs for municipal waste treatment systems in the 208 plan is to include an analysis of alternative treatment systems.**

However, EMMA was prepared as a structural solution, without consideration of nonstructural alternatives or management controls. In addition, with the development of new alternatives through the EIS process, the EMMA planning process had not been finalized. As a result, the 208 agency spent few resources on the communities affected by the plan: structural options were to be defined through the EMMA process, and non-structural options were handled by the recommendation of a blanket package of controls. This obviates the intended planning process -- in effect, the 208 plan for most of these communities is being developed by the MDC and EPA Region I. While the MAPC would have been unable to duplicate the extensive research that went into the EMMA study, its postponement of EMMA review made joint consideration of point nad non-point source issues or of combined structural and non-structural options impossible within the framework of the initial 208 study.

Coordination of EMMA and 208 with Basin Planning

The River Basin Plans for the Boston Metropolitan area were developed concurrently with the 208 plans, as was shown in Figure 4-2. These initial Basin Plans concentrated on point source problems and control strategies, and on developing wasteload allocations for the point sources.

The intent of the Commonwealth has been to update the Basin Plans using the results of the 208 process, including non-point source estimates based on the 208 Plans. In addition, the wasteloads and the point source estimates and control strategies are expected to be updated based on information collected in the 208 planning process.

As described above, the 208 basin reports for the Boston Metropolitan area have used primarily secondary data, and the stream sampling effort has been limited, and has not been integrated into the control strategies. However, it may be possible to update the Basin Plans in most parts of the region, using the 208 results.***

The exception arises in the streams which discharge into Boston Harbor, where the EMMA report again enters into the process. Although the EMMA report does not meet the formal requirements for such a plan, it was accepted by EPA and the Commonwealth as the Basin Plan for the Boston Harbor areas.**** It was concluded that EMMA "substantially meets the intent" of 40CFR 131.

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*40CFR 131.11 et. seq.

**40CFR 131.11(h).

***This has been remedied by the publication of separate reports on stormwater and septage management between publication of the Basin reports and the Draft Areawide Plan. Findings from these studies were incorporated into the alternatives outlined in the draft areawide plan.

****Letter from Thomas C. McMahon, DWPC, to John A.S. McGlennon, Regional Administrator, July 23, 1976, and from John A.S. McGlennon to Thomas C. McMahon, September 13, 1976.

Two reasons have been stated in the interviews for the selection of the EMMA report as the Boston Harbor Basin Plan. One is simply that it would save effort, because of the extensive work that had already gone into preparing EMMA. This, however, is not a strong excuse for accepting a plan which does not meet the requirements and the second line of reasoning expands on it. The claim is made by DWPC staff members that the major source of pollution in the harbor is the Combined Sewer Overflows, and that, until they are corrected, it will be impossible to estimate the water quality impacts of the other sources, or to effectively estimate wasteloads, beyond the analysis already contained in EMMA. Under this reasoning, furhter modeling and analysis for the harbor would be fruitless, and the goal of expeditiously correcting the CSOs should be given top priority. Later, it will be possible to analyze the actual impacts of other sources, and develop wasteload allocations.*

The regulations on the Continuous Planning Process indicate that the purpose of these plans is to assign goals for achieving water quality standards through technical analysis and a public hearing process (40 CFR 130 et. seq.). While the EMMA planning process did produce effluent limitations for the Boston Harbor, the water quality analysis was not conducted on a segment basis, and the purpose of EMMA was not to develop methods for meeting water quality goals on each segment of the rivers in the study. Additionally, as part of the designation process, the requirement for public hearing on the proposed water quality classifications (40 CFR 130.10 (1)) was waived, as EPA felt that the public participation effort conducted during the EMMA planning process was sufficient to meet these requirements. It should be noted here that the public meetings and other outreach programs conducted under EMMA did not concentrate on water quality classification, but were directed at structural alternatives in the MSD.

This use of EMMA has implications for Basin Planning in the Boston Harbor area. EMMA is the current Basin Plan, but is also the major portion of the 208 plan for the area. Therefore, only limited data are being developed for updating, and it appears unlikely that a Basin Plan which meets the goals of the Continuing Planning Process will be developed for Boston Harbor. At the very least, the EMMA construction recommendations will be supported in the Basin Plan, since they will be a precondition to it, rather than a result of water quality analysis and public participation.**

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*See the ERT Phase II report on Water Quality Goals and Objectives for further details on this point.

**As the alternatives are modified through the EIS and other planning efforts, these effects become blurred and it is increasingly more difficult to determine the relationship between any study of the area and water quality.

4.3 AREAWIDE PLANNING AND THE PUBLIC

Public participation has played a large role in shaping the areawide and other regional plans developed in the Boston area. Federal policy has institutionalized public participation. It is accepted for the most part as a necessary element of the planning process, and budget appropriations are made for the activity. This indicates a significant change in attitude over time among agency personnel, local officials and the public at large.

The EMMA Study

The SENE Study created the first institutionalized broad-based public participation program for water planning in this area (see Chapter 3). This was followed by the development of a public participation program for the EMMA Study, which was the first of its type in a wastewater study in the Boston area. The citizen involvement in EMMA represents a sharp break from the traditional method for providing public input--the public hearing--even though active citizen involvement did not start in EMMA until the study was a year old. It is important that such a program was instituted, and the citizens who participated feel that they had a significant input into the planning process.

EMMA's Citizen Advisory Committee (CAC) was created by the project's Technical Subcommittee in September, 1973. The original purpose of the CAC was to "help the Technical Subcommittee in its public involvement program, and to make recommendations on how to improve it." Its functions broadened, however, as its members assessed much of the technical work reviewed by the Technical Subcommittee.* The CAC was successful in obtaining a seat on the Technical Subcommittee (which has been composed exclusively of representatives from interested Federal and state agencies). The CAC was also successful in broadening the composition of the Technical Subcommittee even further, by successfully lobbying for a seat on the Subcommittee for the Department of Public Health. However, the CAC failed in its attempt to broaden the study to consider non-structural alternatives in communities outside the current MSD service area to avoid the need for extending sewer service. The Technical Subcommittee decided to keep the study focused on the structural solutions to problems in the expanded MSD, rather than on alternatives, and this issue was dropped from further consideration in the EMMA study. The CAC encouraged the concept of satellite treatment plans as alternatives which would reduce interbasin transfers compared to plants in the Harbor.

The EMMA study hosted five series of public meetings throughout the 109-community study area at various phases in the planning process. Four to six meetings were held in each series. The first set, held in November and December, 1973, provided background on the study and its goals and objectives; the second, held in May, 1974, introduced five engineering concepts; the third, in January, 1975, proposed alternative sites; the fourth, in May and June, 1975, presented a construction staging program, organizational alternatives and apportionments of operating costs; the fifth, in September and October, 1975, presented modifications to the construction schedule, procedures leading to the recommended management alternative, an allocation of cost and the resultant financial impact on each community.** Special meetings for local public officials were also held during the planning process, although they were not well attended.

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*EMMA Study. Vol. 14: Public Participation, p. 17.

**EMMA Study. Vol. 14: Public Participation, pp. 13-23.

The CAC was composed primarily of members of environmental groups and area watershed associations. Its major interests were often regional; inter-basin transfers, the relationship of water supply to water quality, etc. However, the public meetings did not attract public attention until alternative sites for satellite treatment plants were suggested. When that state in the project was reached, many citizens from the affected communities became active.

At EMMA's third set of meetings held in January, 1975, a total of 214 people turned out at four meetings in the communities near proposed treatment facility sites. This number represented an increase from the 148 at the first series in December, 1973, and also from the second series in May, 1974, when 131 people attended six meetings. In fact, 190 people attended a single meeting in Quincy where there was strong opposition to any expansion of the Nut Island Treatment Plant. A total of 327 people attended the final series of four public meetings held in September to October, 1975, including 200 people from Quincy and 90 people from Wellesley. Both Quincy and Wellesley citizens vere adamant that they did not want new or expanded treatment facilities in their respective areas.

According to the interviews, both MDC officials and public participants were surprised at the public outcry which followed the presentation of alternatives. In response to flared tempers, MDC formed two site selection committees -- one for the Mid-Charles and the other for the Neponset River. The site selection committee members were appointed by the communities in each area. These communities gave local residents an opportunity to address the local issues of facilities siting, and resulted in the identification of several acceptable sites, even though the committee members were not unanimously in favor of the satellite plant alternative.

In addition, some residents took action in more traditional political ways. In Quincy, where the Nut Island Treatment Plant already exists (see Chapter 7), residents of the Houghs Neck community, a well-organized working class neighborhood, rallied their fellow citizens to speak out against expanding the existing facility. The local issues were the filling of portions of the harbor and expanding the plant's capacity to treat more and more waste from affluent suburban communities. Local politicians used the public meeting to speak out against the Nut Island Treatment Plant expansion before their constituents. In the summer of 1977, a bill was passed by the Massachusetts Legislature banning fill at Nut Island, which virtually eliminated the possibility of even upgrading the primary treatment, let alone converting to a secondary system.

The 208 Study

The EMMA Study's final recommendations were being prepared at the same time that the 208 study was getting under way. The 208's public participation effort was structured like EMMA's, although there were important differences. Ten per cent of the 208 budget was originally allocated for public participation and approximately 15% was spent there. One-third of these funds paid staff members, one-third was allocated to watershed associations contracted for public outreach efforts, and one-third was reserved for report publication. Two advisory committees were formed: first, an Areawide Planning Advisory Committee (APAC), with at least 50 per cent of its membership local officials or their representatives. A Citizen's Adivsory Committee was then formed as part of the APAC, with a membership drawn primarily from public interest groups. The CAC was the more active of the two "public" committees. Some of its members were former members of the EMMA CAC, and most were veterans of other environmental public participation efforts, such as those undertaken by transportation studies. Overall, the members of the 208 CAC served much the same role as their counterparts in the EMMA Study: members were interested in regional issues such as the relationship of water supply to water quality. As in the EMMA Study, the CAC voiced a demand for comprehensive water planning in Eastern Massachusetts. The CAC was involved at the beginning of the 208 project, and spent much time on the Project Control Plan, trying to add consideration of these issues.

EPA guidelines published by Region I indicate that a goal of the public participation process is the development of "river constituencies", or clients for clean water.* Several watershed associations have been formed in the Boston area. These are strong citizen groups that act as watchdogs, and are concerned with any issue that affects water use and water quality in their area. The MAPC contracted with five watershed associations to do public outreach at the river basin level, and provided technical assistance to a sixth in its start-up efforts. The watershed associations hired half-time coordinators in January, 1976, to carry out 208 functions, including newsletter publication, workshops and special events, and informal contracts at the community level. These coordinators, in most cases, also worked as members of the 208 geographic basin teams during data collection and issue identification phases of the planning process. The newsletters produced by the watershed associations went to each group's mailing list, expanded under MAPC direction: approximately eight newsletters carried MAPC 208 news on a monthly or quarterly basis to over 8,000 people and organizations in the region. This represented a much wider distribution than the Corps of Engineers' mailing list of some 2,500 people and organizations for EMMA.

To the extent that these associations actively promoted water issues, river constituencies were already developed along several of the area's major streams prior to the 208 project. The Charles River has had a long-standing base of support in the communities through which it flows, and its watershed association is the oldest in the area. The force of the constituency was illustrated in the controversy over the Mid-Charles satellite treatment plant proposed in the EMMA Study. The adverse reaction to this proposal from many communities along the Charles indicates that the river is as one citizen interviewed stated, a "shrine". In fact, the Charles is used for both recreation and water supply. Many people are committed to maintaining these uses, as well as encouraging increased access.

In contrast, the issue of a satellite treatment plant on the Neponset River was received more warmly by the local citizens, although the impacts of locating such a facility in this area will be large (primarily on aquifers from which several of the communities draw their water supplies. One reason for this less hostile approach appears to be that few people living in the Neponset basin view it as a scenic and recreational water body (but see Chapter 6 for their reaction to economic impact).

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*Memo, EPA Region I, "A River Constituency Program Defined," September 30, 1975.

The 208 agency became the catalyst for organizing a watershed association in the only unorganized major river basin in the study area. MAPC provided technical staff assistance to help the Ipswich River Watershed Association get started, by drafting a proposal for funding, and assisting in the development of a newsletter and mailing list. The Association now produces a newsletter, and claims a membership of 150 to 250 people. The Ipswich River is like the Charles in that it is used widely for recreation and for water supply (23 communities draw water from its drainage area). Water conservation and inter-basin transfers have been issues of concern for the watershed association and they are immediate problems for area residents.

In the Boston area, the river constituency appears to be limited to environmentalists, and particularly the "professional citizens" with time to donate to water quality management. Two groups that may have strong interests in the impacts of any water quality management plan are business interests and local officials. A limited attempt was made by the MAPC to involve economic interests in the area: one workshop was held on the South Shore in conjunction with the local Chamber of Commerce, and several industry representatives were invited to join the CAC. However, they were not active on a continuing basis throughout the 208 planning process.

The involvement of local officials was sporadic. The APAC was to be the primary vehicle for their participation, and the MAPC held basin-wide meetings in each area to which some public officials were specifically invited. However, a review of public comments on the 208's Preliminary Basin Reports indicates that many interested public officials were either not contacted by the planning staff, or were contacted informally. These comments indicate that higher visibility of the 208 study could have produced better relations with member communities. However, the fault may not be with the 208 staff: business interests and local officials in all communities were included in the newsletter mailing lists and requested to review Draft plans. Substantive one-on-one meetings might have accomplished more, but we have no strong evidence either way.

The CAC (and to some extent, the APAC) were active at the earliest stage of the project development, and participated in the development of the 208's Project Control Plan. However, within the first six months of the project, it became evident that public expectations of the project were beyond its scope. Growth and water supply issues were two of the most prevalent early concerns among those who participated on advisory committees and in public meetings. This conflicted with EPA's mandate to deal exclusively with water quality. Watershed associations and other citizens encouraged early public meetings. But when the meetings took place, there was very little beyond the conceptual level that could be discussed.

In this regard, the EMMA CAC may have been fortunate that it was not formed until the conceptual phase of the planning was complete. However, this meant that the citizens lost the opportunity to comment on assumptions that were basic to the development of the final EMMA plan. To this day, people who have been involved with the EMMA study ask about the water use figures that were used as the basis for the generation of wastewater flows -- as if there were some chance of changing them now.

The public participants in areawide planning have found themselves in the role of comprehensive planners. In the Boston area, the citizens provide the main support for comprehensive planning, which includes water supply (both surface and groundwater), and water quality considerations (such as low flow augmentation, urban runoff, combined sewers, water recreation, etc.). The EMMA study dealt with sewerage needs in the MSD and the 208 project deals with the quality of surface waters. However, the agencies responsible for preparing the plans do not have the mandate or the funding to move beyond their narrowly construed interest. Public requests for consideration on water supply issues in the 208 study could not be met, except through the impact assessment process. The 1977 Clean Water Act represents a step in the direction of comprehensive planning, with its consideration of water conservation, joint development for recreation, and compensation for facilities such as Deer Island. However, the studies done under Section 208 represent a scheduling of Federal grants over the next twenty years. The present inability to include the comprehensive issues will make it difficult to effectively consider them in the annual updates to these management plans.

4.4 REGIONAL PLANNING AND LOCAL PLANS

In spite of the relief from some of its planning responsibilities provided by the 208/MDC Memorandum of Agreement, the MAPC has had problems in coordinating its work with the desires of some of its member communities. Many of these communities would like a detailed review of alternatives to conventional sewering for problem areas, and this has not been provided in a systematic way.

Formal 201/208 Coordination

The national policy on coordination between 208 planning and the facilities planning done by local governments and their consultants is clearly laid out in Program Requirements Memorandum 75-38.* Before the final approval of a water quality management plan, the facilities plans indicated on the state's priority list are to continue to be funded with 208 review made through the A-95 process. After the water quality management agency has submitted its interim outputs (usually nine months following the receipt of the grant) and has had them approved by EPA, facilities plans in the area should incorporate the 208 data on population and economic projections and on wasteloads. For those communties expected to commence the facilities planning process within five years after the approval of the initial 208 plan, the areawide plan is to provide a brief analysis of elements of the facilities plan, including:

- selection of service areas;
- a preliminary estimate of municipal flows over the 20 year planning period;
- preliminary identification of costs of alternative treatment systems;
- costs of various configurations of trunk sewers;
- summary of environmental impacts of each alternative;
- a preliminary determination of the most cost-effective alternative;
- an estimate of the land area required;
- a description of the required financial arrangements.

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* PRM 75-38. "Relationship between 201 Facility Planning and Water Quality Management (WQM) Planning." February 9, 1976.

***Ibid*.

Once the 208 Plan is approved by EPA the management agencies established by the 208 process will be recipients of the 201 grant for new facilities plans.

The Region I office has issued several draft position papers on the subject of 208-201 coordination. An early memo on "Suggested Procedures for Coordination of 201-208" programs distributed by the Region I office indicated that the burden is on the 208 staff to coordinate with local facility planning processes. Suggested mechanisms are meetings with local officials in communities setting up 201 work, review of the State construction grant priority list, and the A-95 review process. The 208 agency should plan to participate in the 201 planning process of the community, receiving and commenting on draft reports as they are issued.* The specific areas in which the 208 staff is expected to be of assistance is left open by the Region I Memo. While it is relatively simple for the 208 agency to take as constraints the material developed by completed or on-going 201 plans, this is clearly a passive role.

Guidance from the Region I Office has taken the coordination requirements one step further. P.L. 92-500 require that any proposed treatment works be included in an areawide wastewater treatment managment plan as a prerequisite for federal funding (where applicable)** and Region I has interpreted this to mean that, "As a minimum, completed 201 facilities plans should be formally incorporated into the 208 plan by reference."***

At the start of the 208 program the DWPC identified in a memo the needs for 208 and 201 studies in the MAPC's area.+ These needs are shown in Figure 4-4. By the end of FY-1977, many of the communities in the study area had completed facilities plans or were in the process of completing them. Figure 4-7 shows these communities, though it may be incomplete, and Tables 4-5 & 4-6 list the grants. They show that only 36 of the 92 communities in the 208 area were not actively engaged in facilities planning during the 208 study, before areawide recommendations on facilities scheduling could be developed. In addition, the figures show that many facilities have been planned and constructed that were not included in the list provided to MAPC.

Non-Structural Control Issues

A review of public comments received on the 208 Preliminary Basin Reports indicates many areas in which alternatives were developed on the basis of incorrect or incomplete information. Another frequently voiced comment is that contact with town officials has been sparse and informal at best (until the publication of preliminary Basin reports).

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*Memo from Region 1 to All Areawide Agencies,"Suggested Procedures for Coordination of 201-208." February 19, 1976.

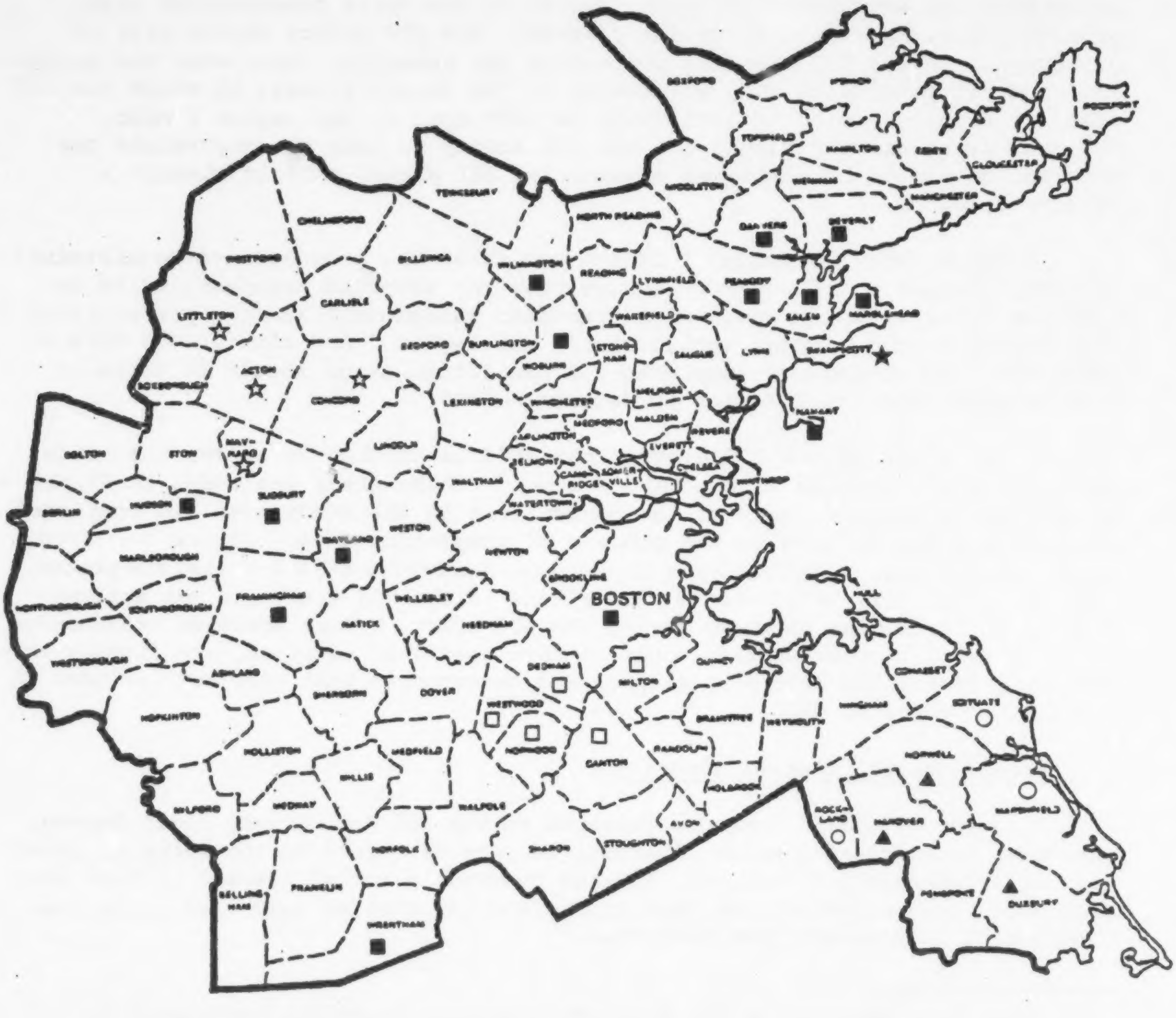
**P.L. 92-500, Section 204(2)(1).

***Memo from Region I to All Areawide Agencies, "Facilities Plans in 208 Plans." June 2, 1976.

+Memo from DWPC to MAPC, "Coordination of 201 and 208 Studies Within the Metropolitan Boston 208 Area." October 17, 1975.

Figure 4-4

FACILITIES NEEDS IDENTIFIED BY DWPC
October 1975


BOXFORD
IPSWICH
ROCKPORT
TOPSFIELD
HAMILTON
ESSEX
GLOUCESTER
WENHAM
MANCHESTER
MIDDLETON
TEWKSBURY
NORTH READING
DANVERS
BEVERLY
CHELMSFORD
WESTFORD
BILLERICA
WILMINGTON
READING
LYNNFIELD
PEABODY
SALEM
MARBLEHEAD
LITTLETON
CARLISLE
WAKEFIELD
BEDFORD
BURLINGTON
STONEHAM
SAUGUS
LYNN
SWAMPSCOTT
WOBURN
ACTON
BOXBOROUGH
CONCORD
LEXINGTON
WINCHESTER
MELROSE
MEDFORD
MALDEN
NAHANT
BOLTON
STOW
MAYNARD
LINCOLN
ARLINGTON
EVERETT
REVERE
BELMONT
SOMERVILLE
CHELSEA
CAMBRIDGE
WINTHROP
WALTHAM
BERLIN
HUDSON
SUDBURY
WATERTOWN
WAYLAND
WESTON
MARLBOROUGH
NEWTON
BROOKLINE
HULL
BOSTON
NORTHBOROUGH
SOUTHBOROUGH
FRAMINGHAM
WELLESLEY
NATICK
NEEDHAM
COHASSET
WESTBOROUGH
ASHLAND
DEDHAM
MILTON
QUINCY
SHERBORN
DOVER
WESTWOOD
SCITUATE
HINGHAM
HOPKINTON
BRAINTREE
WEYMOUTH
NORWOOD
HOLLISTON
MEDFIELD
CANTON
RANDOLPH
NORWELL
MILLIS
HOLBROOK
MILFORD
MEDWAY
WALPOLE
MARSHFIELD
ROCKLAND
HANOVER
AVON
NORFOLK
SHARON
STOUGHTON
BELLINGHAM
FRANKLIN
PEMBROKE
DUXBURY
WRENTHAM

☆ 208 should examine intermunicipal alternatives and/or septage disposal; no apparent applicant for 201 funds

★ Secondary Treatment required by Federal regulations, although water quality standards are being met by primary plant low priority for 201 funds

□ Neponset Reservoir has non-point source problems. Existing system needs should be funded under 201, facilities impact on reservoir studied by 208

▲ Septage disposal problems should be studied by 208

■ 201 Study needed

○ 201 Study on-going

Table 4-5

MASSACHUSETTS CLEAN WATER PROGRAM STEP 1
CONSTRUCTION GRANTS AWARDED FY 1975-1977

Year	Community	Project Type	Grant Amount ($000)*
1975	Hudson		78.4
	Millis		33.6
1976	Revere		69.0
	Saugus	Facilities Plan	70.6
	Wrentham		42.4
	Watertown	Infiltration/Inflow Study	44.9
	MDC		137.8
	Newton	Infiltration/Inflow Study	46.5
	Walpole	Facilities Plan	41.4
	Ipswich	Facilities Plan (septage)	14.6
	MDC		441.0
	Gloucester		75.6
1977	Duxbury	Facilities Plan	15.1
	MDC	Infiltration/Inflow Study	625.5
	Medford	Infiltration/Inflow Study	83.7
	Winchester	Infiltration/Inflow Study	69.0
	Lexington	Infiltration/Inflow Study	52.9
	South Essex S.D.	Facilities Plan	348.3
	Gloucester	Facilities Plan	24.4
	Cohasset	Facilities Plan	90.9
	Bedford	Facilities Plan	123.7
	Beverly		88.5
	MDC		133.8
	Salem	Infiltration/Inflow Study	41,250
	Manchester	Facilities Plan	18.8
	Quincy	Facilities Plan	46.4
	Essex	Environmental Assessment	71.8
	Malden	Facilites Plan	55.4

Source: EPA Region I Grant List, Mass. DWPC Priority Lists

*This is the amount of the Federal grant. Actual project costs will be higher depending upon grant eligibility.

Table 4-5a
MASSACHUSETTS CLEAN WATER PROGRAM STEP 2 CONSTRUCTION GRANTS AWARDED FY 1975-1977

Year	Community	Project Type	Grant Amount ($.000)*
1975	---	---	---
1976	Rockport	Pumping Station, Force Main	64.1
	Melrose	Pumping Station, Interceptor	109.9
	Medfield	Collectors	171.7
	Randolph	Collectors	237.7
	Westwood	Pumping Station, Collectors	284.2
	Marshfield	Treatment Plant, Outfall, Interceptors	363.4
	Rockland	Treatment Plant	381.5
	Medway	Collectors	158.3
	Franklin		150.6
1977	Manchester	Collectors	19.0
	Waltham	Interceptor	533.0
	Medfield		163.7
	Weymouth	Collectors	99.8
			306.8
	Hull		119.2
	Stoughton	Collectors	115.4
	Ashland	Pumping Station, Collectors	56.3
	Marlborough		78.8
	Gloucester		72.7
			34.4
	Boston	Separation and Treatment (South End)	396.5
	Lynn	Treatment, Interceptor	1239.7
	Nahant	Pumping Station, Force Main	184.6
	Ashland		64.6

Source: EPA Region I Grants List, DWPC Priority Lists

*This is the amount of the Federal grant. Actual project costs will be higher, depending upon grant eligiblity.

Table 4-6

MASSACHUSETTS CLEAN WATER PROGRAM STEP 3 CONSTRUCTION GRANTS AWARDED FY 1975-1977

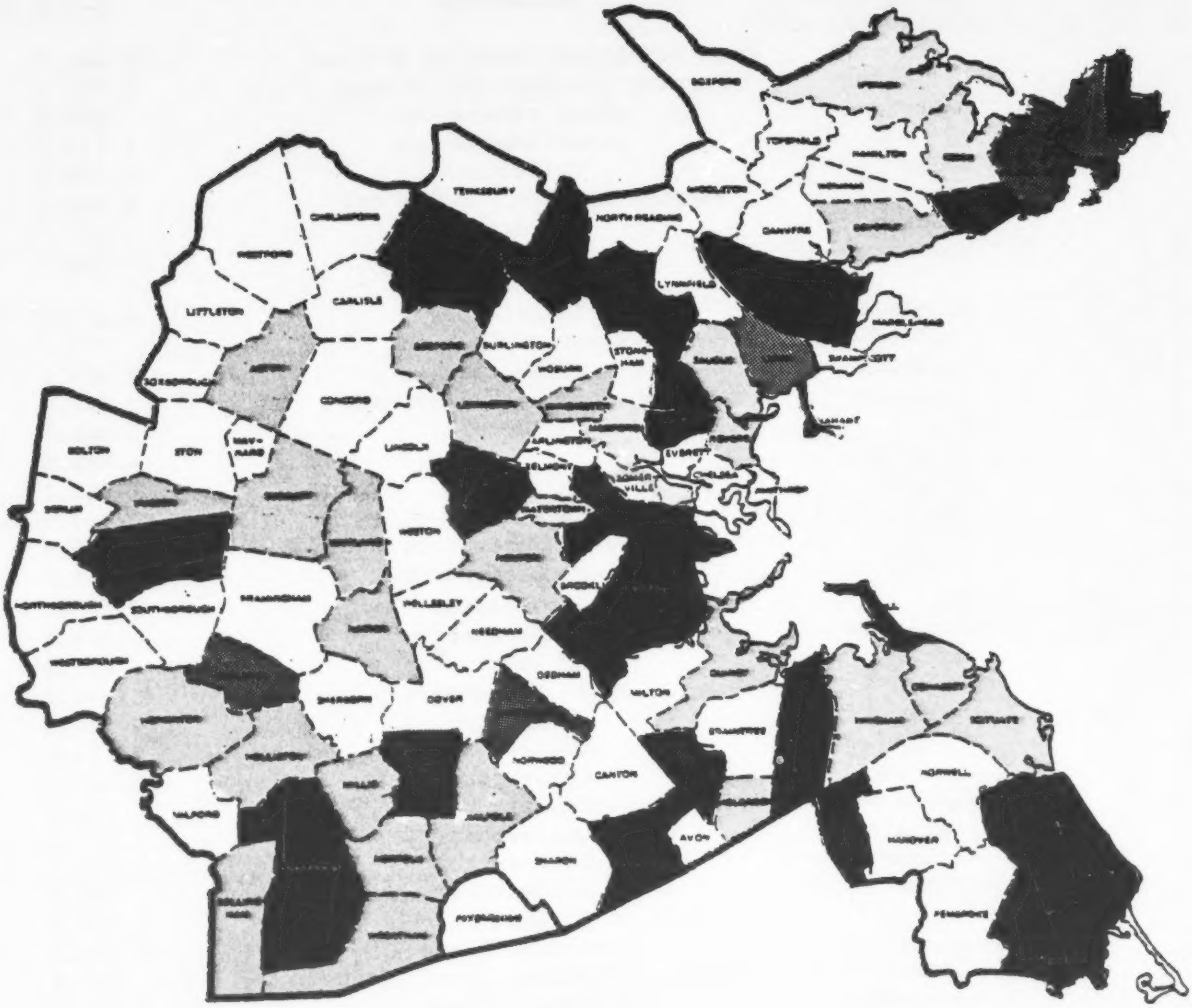
Year	Community	Project Type	Grant Amount ($.000)*
1975	Hull		8,993.3
	South Essex S.D.	Treatment Plant	5,250.0
1976	Marlborough	Collectors	648.6
	Charles River PCD	Interceptors, Pumping Station	18,843.7
	Billerica	Pumping Station, Collectors	6,045.1
	Cambridge	Sewer Separation	575.8
		Sewer Separation	3,112.8
	Salem	Collectors	3,104.0
	Peabody	Pumping Station, Collectors	2,936.5
	Reading	Collectors	1,237.7
	Medway	Collectors	1,505.4
1977	Wilmington	Interceptor	4,271.4
	Cambridge	Sewer Separation	373.7
	Randolph	Collectors	3,429.1
	Rockport	Pumping Station, Force Main	1,397.2
	Hull	Collectors	1,946.5
	Weymouth		4,468.5
	Weymouth	Collectors	1,585.2
	Wakefield	Force Main, Collectors	1,093.9
	Boston	Sewer Separation	3,355.6
	Boston	Sewer Separation	5,192.5
	MDC	Interceptor	3,175.8
	Cambridge	Sewer Separation	1,483.0
	Malden	Sewer Construction	827.2
	Boston	Sewer Separation	5,980.5
	Medway	Collectors	2,480.0
	Salem	Collectors	2,324.9
	Stoughton	Collectors	1,167.5
	Manchester	Collectors	403.2
	Franklin	Collectors	2,417.8
	Waltham	Interceptor	2,242.0
	Duxbury	Collectors	452.8
	Peabody	Collectors	5,674.9
	Marshfield	Treatment Plant	11,956.3
	Melrose	Pumping Station, Interceptor	893.4
	Rockland	Treatment Plant	8,342.9

Source: EPA Region I Grants List, DWPC Priority Lists

*This is the amount of the Federal grant. Actual project costs will be higher, depending upon grant eligibility.

Figure 4.7

GRANTS MADE TO COMMUNITIES, FY 1974 to FY 1977


BOXFORD
TOPSFIELD
HAMILTON
WENHAM
MIDDLETON
DANVERS
TEWKSBURY
NORTH READING
LYNNFIELD
MARBLEHEAD
SWAMPSCOTT
NAHANT
CHELMSFORD
WESTFORD
LITTLETON
CARLISLE
BOXBOROUGH
BURLINGTON
WOBURN
STONEHAM
CONCORD
BOLTON
STOW
MAYNARD
LINCOLN
ARLINGTON
BELMONT
EVERETT
SOMERVILLE
WATERTOWN
WESTON
NORTHBOROUGH
SOUTHBOROUGH
FRAMINGHAM
WELLESLEY
NEEDHAM
BROOKLINE
WESTBOROUGH
SHERBORN
DOVER
DEDHAM
MILTON
NORWOOD
CANTON
AVON
SHARON
NORWELL
HANOVER
PEMBROKE

Highest level on any project:

░ Step I: Facilities Planning

▒ Step II: Design

█ Step III: Construction

SOURCES

DWPC Annual Reports, 1974, 1975;
Grants List, Jan. 1975 to Sept. 1977;
MAPC 208 Project

its first year, the 208 staff made an attempt to set up meetings with officials in each of its 92 member communities. While formal meetings were held with representatives from all but one community (the exception notable being Boston), and agency consultants met with local Boards of Health, there were often difficulties in identifying a consensus or representative opinion in many towns.

The public comments on the Preliminary Basin Reports indicate a lack of confidence on the part of local officials in the ability of the 208 program to develop solutions that are responsive to their water quality needs. In the towns that are only partly sewered or are not sewered at all, the position taken by the 208 planners with respect to solutions to existing problems has added to this lack of confidence: "While other approaches to water quality may be equally effective in preventing problems, often the use of sewers is most effective in solving water quality problems."*

The alternatives developed in the 208 Preliminary Basin Reports represent various levels of reliance on sewers. However, many town officials do not feel that non-structural solutions were addressed in sufficient depth, and thus do not think that the 208 agency is capable of providing the kind of technical assistance useful to them in coordinating 208 with 201 planning.
The methodology developed by the 208 agency eliminated the use of non-structural solutions for control of existing problems. First, problem areas were identified for each community based on:

- existing and programmed service areas;
- projected development (under existing land use trends) and the capability of land to sustain this development with existing land use controls;
- existing problem areas identified by local officials and the DWPC; and
- existing areas with failing septic systems as identified by the agency's consultant.

This inventory of problem areas was revised on occasion after publication of the preliminary Basin reports upon receipt of comments by individual towns, pointing out problem areas that had been missed, or areas that should not have been included. The report on septage management published separately after the Basin reports also provided input on existing problem areas.

The development of potential sewer service areas was then based on three criteria:

> "1. Immediate (or near future) extensions of an existing sewer system to serve existing development in the identified problem areas. In communities having no existing sewer system, the initial service areas were based on identified problem areas.

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*MAPC Water Quality Project. SuAsCo Preliminary Basin Report. September, 1977. p. 6-1.

2. Extensions of an existing sewer system to serve existing, unsewered development or extensions of criterion 1 systems to serve existing development in areas adjacent to the identified problem areas.

3. Extensions to serve projected development in areas of prime and moderate suitability for development or continuation of criteria 1 and 2 systems identified above into areas with prime and moderate development suitability as defined in the DeFacto Projection." (land use projection assuming the extension of existing development patterns)*

In effect, the potential sewer service areas include all the existing problem areas. This approach does not leave any room to treat existing problems with non-structural approaches, which was a goal of many of the communities not served by the MDC.** The preliminary Basin reports represent a relatively inflexible position with respect to alternatives to conventional solutions. They were little more than pre-facilities plans, directed at the relatively easy structural solutions, without sufficient detail in the more difficult non-structural solutions and non-point problems.***

Septage

The MAPC attempted to broaden its consideration of on-site systems with a study of regional septage management alternatives, released in December, 1977. The study was prompted by major problems in existing methods of septage handling. This report was not an integral part of the 208 analysis (i.e., the Preliminary Basin Reports), but it presented a response to an upcoming problem.

The problems of coordinating septic tanks with other treatment systems are only beginning to be fully recognized in the study area. In the MSD, member communities that are only partially sewered use dosing stations for septage disposal into their sewers, which then convey the septage to the MDC system. When the MDC discovered higher than expected amounts of septage, it concluded that a great deal of septage was being illegally dumped into its sewers. For example, some member communities were charging non-member municipalities and private disposal companies to discharge into their facilities without informing or reimbursing the MDC. The MDC took steps to end unauthorized discharge of septage, precipitating, in the words of one EPA official, "a crisis". A compromise was worke out in 1974 by which the MDC would accept septage on an interim basis from non-member communities, thus allowing them time to develop alternative solutions without subjecting them to the higher costs of full membership.

The MAPC has prepared its study of septage management as a result of requests from communities in its study area for help. Many of these communities have been forced to develop proposals for management of their own septage by the MDC's actions, and the 208 agency has been viewed as a potential resource here. The study analyzes alternatives such as composting, treatment of the septage at other treatment plants and aerobic/anaerobic treatment such as the proposed Sudbury-Wayland facility. The 208 project has also been involved somewhat in the interactions between the MDC and the peripheral communities, but this involvement has not been extensive. Its major action with respect to septage management has been the preparation of a single report analyzing options for septage handling which could be implemented by communities in its study area. Preparation of this report was delayed while staff emphasis was focused upon development of the preliminary Basin reports (in response to Region I's directive to produce tangible evidence of baseline development on an individual town basis). As such, the septage management report was not integrated into the overall planning process until after publication of the preliminary Basin reports and after the closing date of this study.

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*Ibid., pp. 407, 4-8.

**Acton's comments show this: "There is grossly insufficient evidence in the report to indicate a need for sewerage systems..." Town of Acton, op. cit.

***These elements were apparently delayed by the EPA pressure for implementation referenced earlier.

The Department of Environmental Quality Engineering is performing a statewide analysis of the septage problem (through the Regional Environmental Engineers), and is supporting a solution involving maximum use of existing treatment plants for septage management. MDC has not shown any physical damage from handling the septage, only economic losses because the septage is not paying its full costs. Therefore, DEQE feels that some arrangement should be possible which allows the MDC to charge non-member areas a fair cost for septage management; this would maximize the environmental health of the Commonwealth and improve cost-effectiveness, since new septage-only facilities would not be required and travel distances would be shortened for many communities.

4.5 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The draft Basin Reports from the 208 study present little more than suggestions on where communities should provide sewers. There is some analysis of landfills and other pollution sources, and a uniform set of nonstructural suggestions on landfill control and wetlands zoning, but the main focus of the reports is on facilities requirements for each town. There are several reasons for this emphasis:

- The late funding of the 208 project meant that a great deal of facility planning had already been performed in the area through step 1 plans and the EMMA study; these needed to be incorporated into the 208 plan.
- The MAPC concluded that all existing problem areas should be sewered, early in its analysis.
- EPA's requirement for solutions for each community led to individual analyses of the 92 cities and towns, in preference to areawide analyses.
- EPA's emphasis on implementation led to emphasis on the issues where implementation appeared most likely.

Water quality analyses, estimates of urban and rural non-point sources, and analysis of septage management have been done by the MAPC, but have received little emphasis, and have not been included in these draft reports.

The towns have not reacted favorably to these reports. They have been critical of the limited analysis of the problem areas, and the decisions that structural options were the only alternatives for these areas. Many of the communities have shown a desire for analysis of non-structural options, but they have not received this analysis in the draft 208 reports.*

Even with ideal management, it is difficult to see how the 208 process could have successfully considered areawide issues. The planning period was limited to two years, of which about six months were spent in receiving approval for its project control plan, and three to six months were reserved for the preparation of a foundation for implementation. It was required to make use of existing data wherever possible, but also required to meet the full range of planning elements, with detailed methods and requirements continually revised by the national and regional EPA programs. The areawide issues of water quality, non-point source control, water supply, and growth management appear to have been too difficult to address in any detailed way within these many requirements. Implementation of recommendations in these areas would also be difficult, so the 208 process focused on the easier options described above. However, this focus has meant that the 208 plan either repeats or contradicts other facilities planning, and adds little that is new.

The EMMA plan has distorted the planning process envisioned in P.L. 92-500. By being used as both the major portion of the Boston Harbor 208 Report, and the initial Basin Plan for the Harbor area, it has led to decisions on facilities being made before the detailed water quality assessment. The 208 plan and the initial and revised Basin Plans are based on EMMA, so that Basin Planning in the Boston Harbor leaves a gap in the nominal process, with only limited work on stream classification, wasteload allocations, and public participation.

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*Most of these towns were satisfied with the non-structural alternatives presented in the draft areawide plan, largely because the agency apparently adopted their suggestions wholesale, often in preference to its own Basin Reports.

Recommendations

We believe that water quality should be considered on an areawide or regional basis in planning. Therefore, we belive that the next Basin Plan for Boston Harbor should perform a detailed analysis of the area, and should be separated from the facilities constraints placed on it by the EMMA plan. On a larger scale, we believe that the Basin Planning process is an important part of the Clean Water Act, and that it should be fully implemented in all areas, with all the required elements. Where data and analyses can be provided from 208 projects or other plans, this is efficient; however, the Basin Plans should not limit data collection to the materials which can be provided by other parts of the process.

It appears that the 208 program has been ineffective partially because it tried to do too many things too quickly, and without accurate methodologies for the more difficult problems. Areawide analysis of facilities and management controls must be tied directly to water quality, and to the needs of the area as a whole.

The "Level B" studies could be useful here in setting goals and identifying issues of interest. The basin plans developed under the state's Continuing Planning Process could also be useful in setting water quality priorities, and identifying those of areawide importance. Given a more limited set of issues, it would be possible to focus resources on them, with individual town problems dealt with through a strong technical assistance program provided by the areawide agencies to the communities.

Our recommendation, then, is that the areawide studies be made more specific and manageable from the start, rather than being subjected to changing rules and large numbers of conflicting requirements. Future planning should concentrate on important local and regional issues, with a much clearer definition from the start of the goals, objectives, and methods of study. We also believe that these areawide studies should be funded individually, rather than through general grants covering the nation. We recommend that these individual grants be directed at single issues which affect basins or other large areas, such as the effects of wastewater management on water supply; control of a specific category of non-point source for a large area; or attempts to match water quality to recreation. In essence, this approach would use the 208 process as the implementing vehicle for major recommendations arising out of the "Level B" studies or the Basin Plans.

In addition, to give some incentive for the completion of the 208 plans, we recommend that a certified 208 plan be a precondition for new 201 grants after a fixed cut-off date. This will ensure that the 208 plans are directly included in the planning process; current regulations provide for 208 plans to be effective after certification, but do not give the states and local governments any incentives to get the plans certified, and "partial certification" or "limited certification" are likely to be the operational results.*

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*The issue of 208 plan certification is largely outside our study's time period, but appears to be a significant one where Federal policy is, to say the least, confused.

CHAPTER 5

FACILITY PLANNING, DESIGN, AND CONSTRUCTION

The Construction Grants Program is the largest public works program in the nation, and is expected to be funded at $4.5 billion per year for the next decade. Implementation of the EMMA program alone is expected to require $855 million, which will be used by the MDC as the local government responsible for the planning, design, construction, and operation of the wastewater management system. Other grants are expected in the study area, both within the MSD (to provide for conveyance of wastes) and outside it (to provide for treatment in other communities). The allocation to the Commonwealth of Massachusetts will be about $140 million per year over this period.

The program does not simply give away money, however: its requirements are extensive, and funds are granted to local governments only when they meet those requirements. Figure 5-1 provides a flow chart of the Construction Grants process* which shows the steps to be followed. This diagram shows the nominal process, where the applicant initiates a project to reduce a water pollution problem, and proceeds through the grants process, receiving state and EPA review where required.

The EPA role is to review the grant applications and prepare an EIS (if deemed necessary), ensuring that the grantee meets the requirements of NEPA and the Construction Grants regulations.** The state role in this nominal structure includes development and implementation of the River Basin and Areawide plans, and establishment of the Priority List, which -- if approved by EPA -- will determine which projects get funded. State review also occurs throughout the process. The applicant should, in theory, be able to simply follow this guidance and prepare an acceptable facilities plan, develop a design, and construct the necessary facilities; this applicant

> "...must be a public body created under State law and must have the legal authority for the disposal of sewage, industrial wastes or other wastes. The applicant must also have the authority to plan, design, finance, construct, operate, and maintain sewage treatment works.***

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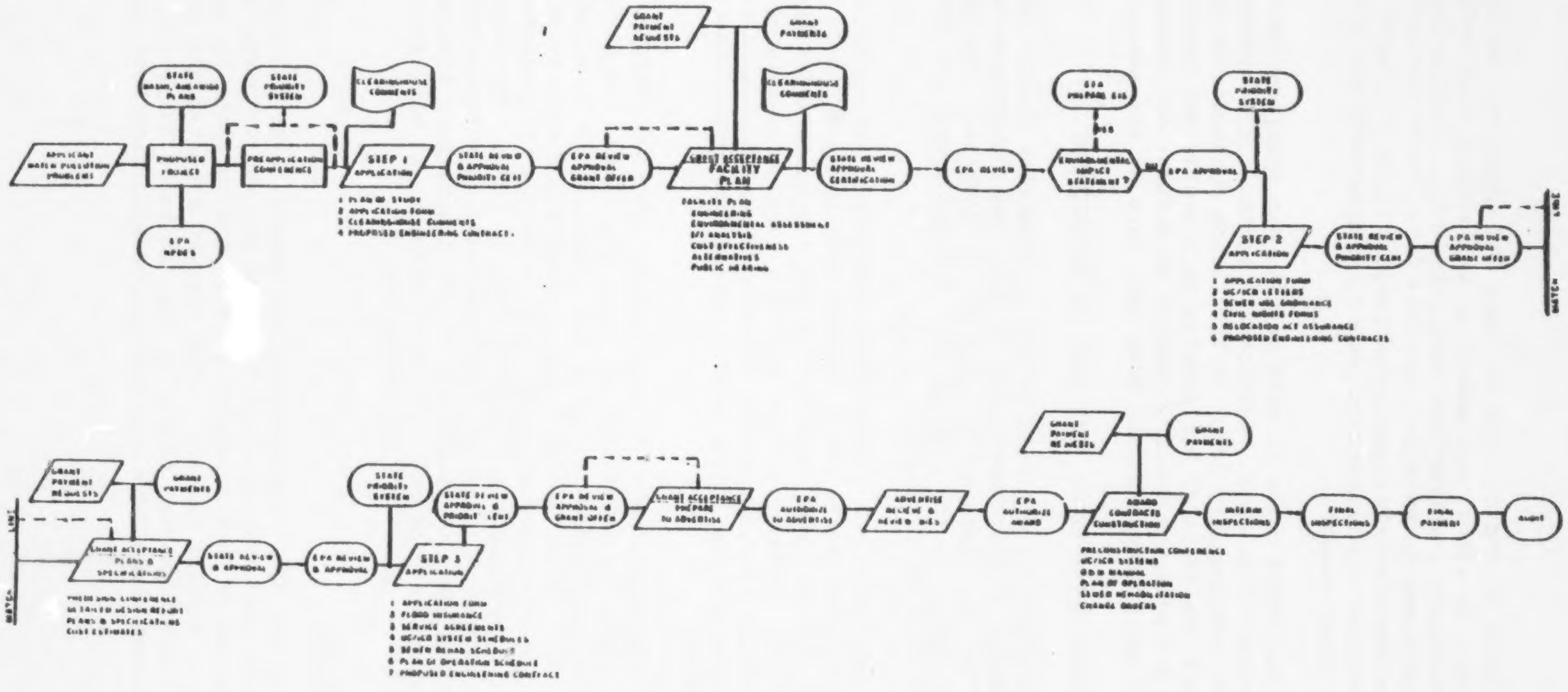
*Prepared for EPA by EcolSciences, Inc. under Contract 68-01-2895. 1976.

**Primarily 40CFR35, but interpreted and revised through Program Requirements Memoranda (PRM), various Guidelines, and other agency sources.

***EPA Handbook on How to Obtain Federal Grants to Build Municipal Wastewater Treatment Works. May, 1976.

Figure 5-1

schematic flow diagram construction grants process


APPLICANT WATER POLLUTION PROBLEMS
STATE BASIN, AREAWIDE PLANS
PROPOSED PROJECT
EPA NPDES
STATE PRIORITY SYSTEM
PREAPPLICATION CONFERENCE
CLEARINGHOUSE COMMENTS
STEP 1 APPLICATION
1 PLAN OF STUDY
2 APPLICATION FORM
3 CLEARINGHOUSE COMMENTS
4 PROPOSED ENGINEERING CONTRACT.
STATE REVIEW & APPROVAL PRIORITY CERT
EPA REVIEW APPROVAL GRANT OFFER
GRANT PAYMENT REQUESTS
GRANT PAYMENTS
CLEARINGHOUSE COMMENTS
GRANT ACCEPTANCE FACILITY PLAN
FACILITY PLAN
ENGINEERING
ENVIRONMENTAL ASSESSMENT
I/I ANALYSIS
COST EFFECTIVENESS
ALTERNATIVES
PUBLIC HEARING
STATE REVIEW APPROVAL CERTIFICATION
EPA REVIEW
ENVIRONMENTAL IMPACT STATEMENT ?
YES
EPA PREPARE EIS
NO
EPA APPROVAL
STATE PRIORITY SYSTEM
STEP 2 APPLICATION
1 APPLICATION FORM
2 UC/ICR LETTERS
3 SEWER USE ORDINANCE
4 CIVIL RIGHTS FORMS
5 RELOCATION ACT ASSURANCE
6 PROPOSED ENGINEERING CONTRACTS
STATE REVIEW & APPROVAL PRIORITY CERT
EPA REVIEW APPROVAL GRANT OFFER
LINE
MATCH
GRANT PAYMENT REQUESTS
GRANT PAYMENTS
GRANT ACCEPTANCE PLANS & SPECIFICATIONS
PREDESIGN CONFERENCE
DETAILED DESIGN REPORT
PLANS & SPECIFICATIONS
COST ESTIMATES
STATE REVIEW & APPROVAL
EPA REVIEW & APPROVAL
STATE PRIORITY SYSTEM
STEP 3 APPLICATION
1 APPLICATION FORM
2 FLOOD INSURANCE
3 SERVICE AGREEMENTS
4 UC/ICR SYSTEM SCHEDULES
5 SEWER REHAB SCHEDULE
6 PLAN OF OPERATION SCHEDULE
7 PROPOSED ENGINEERING CONTRACT
STATE REVIEW APPROVAL & PRIORITY CERT
EPA REVIEW APPROVAL & GRANT OFFER
GRANT ACCEPTANCE PREPARE TO ADVERTISE
EPA AUTHORIZE TO ADVERTISE
ADVERTISE RECEIVE & REVIEW BIDS
EPA AUTHORIZE AWARD
GRANT PAYMENT REQUESTS
GRANT PAYMENTS
AWARD CONTRACTS CONSTRUCTION
PRECONSTRUCTION CONFERENCE
UC/ICR SYSTEMS
O & M MANUAL
PLAN OF OPERATION
SEWER REHABILITATION
CHANGE ORDERS
INTERIM INSPECTIONS
FINAL INSPECTIONS
FINAL PAYMENT
AUDIT

legend:

- ▢ state/epa
- ▱ applicant
- ⬡ decision
- ▭ clearinghouse

prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY

CONTRACT NO. 68-01-2885

prepared by:

EcolSciences Inc.

april, 1976

There is a fourth participant in the process who does not appear on the chart: the applicant's consultant. In almost all cases, an engineering firm under contract to the local government prepares the Facilities Plan, designs the facilities under Step 2, and supervises construction (see Ch. 4 for a list of the grants). The consultant may also provide some start-up support when the plan is turned over to the applicant for operation, and plant operation by private firms under contract is a growing trend (though not in the study areas).

This chapter describes these roles in more detail, and analyzes the actual process in the Boston metropolitan area. Section 5.1 looks at the activities of EPA and the Commonwealth, particularly DWPC, in initiating construction grants. Section 5.2 then considers the roles of all parties in planning and alternative selection while Section 5.3 analyzes quality control in design, and Section 5.4 presents our conclusions and recommendations from this part of the analysis.

5.1 INITIATION OF CONSTRUCTION GRANTS: THE ROLE OF ENFORCEMENT

From the Federal perspective, the role of the construction grants process is simple: it is an attempt to aid communities to meet their NPDES permits, and thus help the nation attain the clean water goals set by Congress. The permits place an enforcable requirement on the communities, and the grants are provided to help them build the facilities required.

On the local level, however, the construction grants are the major focus of activity, with the permit requirements often appearing to be secondary. Enforcement is used to keep the process going, but the immediate goal of enforcement is a construction grant, with the expectation that this will lead to compliance with the permit. This is a reasonable 1st step, except that the construction grant seems to have become a necessary part of the process, rather than an aid for those communities who can comply with its provisions.

Existing municipal discharges have, by this point, received NPDES permits. If the facility does not meet the applicable effluent standards, the permit will contain a compliance schedule designed to bring the discharge up to standards by a certain date. Under P.L. 92-500, all such permit conditions were to be met by July 1, 1977; this deadline has been extended under a series of conditions in the 1977 Amendments,* with compliance required by July 1, 1983. The required treatment is secondary for most discharges, with some needing various types of AWT to meet the stream water quality standards. A few dischargers with ocean outfalls may be permitted to provide only primary treatment, if they can meet the requirements of Section 44 of the 1977 Clean Water Act.

Enforcement and the MDC

Consider the case of the MDC. The original MDC permit, like all others, contained the July 1, 1977 deadline, by which time the MDC was required to have secondary treatment in place at both treatment plants, and to clean up all Combined Sewer Overflows in a similar manner. Later the MDC received the first Enforcement Compliance Schedule Letter (ECSL) in the nation in July, 1976. In essence, this letter allowed the MDC to continue discharging from Deer and Nut

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*Section 45.

Islands and the various Combined Sewer Overflows, as long as it made progress towards completion of abatement facilities. The letter recognized that the July 1, 1977 deadline would not be met, and stated that EPA would not take further enforcement action if MDC complied with the proposed schedule. The ECSL was a direct attempt to avoid any legal action, while still ensuring that progress would be made towards meeting the requirements of the Act.

The situation has deteriorated somewhat since the ECSL was issued, and further enforcement actions have been taken. The MDC has been slow in complying with the ECSL requirements allegedly, in part, because of EPA's failure to complete its EIS on the MDC Treatment Plants on schedule (See Chapter 6). Other delays have occurred on the Facilities Plans for the Combined Sewer Overflow projects and various other reports, with the MDC progressing slower than the ECSL requires, and therefore violating the terms of the ECSL, and its NPDES permit.

The 1977 Amendments complicate this progress, since they allow certain municipalities to gain an exemption from the secondary treatment requirements; while it appears that the MDC will not be eligible, given the legislative history of the section,* the result may be a further delay to secondary treatment. Almost all interviewees felt personally that secondary treatment was probably unnecessary for the MDC discharges,** though this is clearly not the official EPA position.

The MDC would not have proposed secondary treatment in the near future without the requirements of the Clean Water Act as implemented through its permit. The original construction schedule for EMMA provided secondary treatment by the year 2000, and EPA and the MDC modified this to 1985, in the ECSL negotiations.

In the ECSL, the compliance schedule is specifically directed at progress by the MDC towards receiving grants for the construction of treatment works. Time schedules were developed based on the three steps of the grants process, and EPA's EIS is being performed before MDC's grant application, in an attempt to speed up the grants process. The enforcement to date has been directed at the performance of step 1 plans, and the requirements of EPA grants and at the individual tasks which must be performed by the MDC in meeting those requirements.

Admittedly, it is difficult to picture the MDC spending $855 million of local funds on the system; the construction grants appear to be necessary from its viewpoint. They may also be the most direct route to meeting the permit requirements with respect to effluent quality, and it is reasonable for EPA to make every effort to reduce its compliance costs through the grants procedure. Still, the various officials interviewed have all assumed that the only available approach starts with enforcement, which leads to one or more construction grants, and finally to achieving the effluent quality required for the discharges. In the MDC case, at least, enforcement is directed at the details of the grants process, through the ECSL, and only indirectly at the quality of the discharges.

Enforcement and Other Communities

A similar pattern arises in other communities. While a number of areas desired facilities for local reasons, these needs were met early in the process, according to interviews with DWPC officials. As might be expected, most community officials interviewed stated that they felt they were forced to build or upgrade their plants, by Federal and state action, either through the NPDES process applied to existing discharges, or through requirements for correction of existing public health problems. Those sites which still require facilities are neutral or opposed, and the threat of enforcement will be important, as it has been for current grants.

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*The legislative history distinguishes between facilities discharging effluent into deep vs. relatively shallow marine waters. However, the MDC has submitted an application for a variance.

**See comments by the Mass. Division of Water Pollution Control, in Appendix E to this report.

It is not surprising that enforcement is a necessary step (or, at least, a necessary threat) in most instances, since the benefits from pollution abatement are generally gained away from the point of abatement. This is the reason for Federal and state involvement, and enforcement overcomes the existing local incentives. The major question is whether enforcement is being used to assist the construction grants program or to force communities to meet their NPDES permits, since these two objectives may not always be identical. There are three types of evidence which could, potentially, be brought to bear on this point. Obviously, if enforcement proceeded independently of construction grants, there would be an incentive for communities to build their own facilities without Federal contribution. This has not happened in the study area -- all new or upgraded POTWs have been constructed with grants.

It might also be possible to observe cases where the grants process was stalled for some reason, but enforcement proceeded. This may occur soon in the case of Westborough, where regionalization has been a major issue. Westborough and Shrewsbury initiated Step 1 planning efforts, and were required by DWPC to consider regionalization. Their consultants prepared step 1 plans which found that regionalization would be cost-effective, and DWPC determined that only a regional solution would be funded. Since then, Shrewsbury has appropriated funds for a step 2 design of the regional plant, but Westborough has not. State officials have expressed a willingness to enforce Westborough's permit, so that the town would have to build its own plant without funding, if it remains unwilling to participate in the regional facility. However, enforcement actions have not yet been started.

In Concord, the treatment plant is overloaded, and discharges into the Great Meadows National Wildlife Refuge. The plant requires upgrading and expansion, and was the subject of a facilities plan in 1972. At that point, it appeared that regionalization might be attractive, and funding for Concord was delayed until a feasibility study of regionalization could be performed by DWPC. Enforcement by EPA and DWPC has not proceeded in anticipation of the findings of the regionalization study though the Department of Interior is beginning to take some action because of damage to the wildlife refuge.*

A third indicator of the connection between enforcement and construction grants is the relative levels of enforcement against facilities with operations problems versus facilities requiring capital investment. Through the interviews, we found that the focus of enforcement to date has been on getting the necessary facilities built, since this was viewed as the most productive short-term approach. Enforcement of permits for O&M is considered in more depth in Chapter 7.

It appears from these examples that enforcement of permits has been closely tied to the Construction Grants process. Enforcement has often been necessary to get the communities to make any progress towards constructing the necessary facilities, according to both community and agency officials. However, it also appears that delays in the Construction Grants have led to delays in enforcement; this is clear in the case of the MDC, but was also found for Concord and confirmed in the interviews. Priority has been given to enforcement actions which would assist in the Construction Grants process, at least to date.

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*Correspondence from Roger Sumner Babb, Regional Solicitor, U.S. Department of the Interior, Newton Corner, MA to Mr. Paul J. Flynn, Town Manager, Town of Concord, MA, January 6, 1978.

5.2 PLANNING AND THE CHOICE OF TECHNOLOGIES

The overall purpose of construction grants is to help the communities meet their NPDES permit requirements, and thus lead to clean water. However, any grants program must be managed effectively, so that both EPA and DWPC have become deeply involved in the grants process. Numerous requirements have been placed on the grants by Congress, for example: it is necessary that these be implemented. The Federal and state funds should also be spent where they will do the most good; this required the creation and use of management tools such as the state Priority List, the cost-effectiveness analysis, and audits. The major issue for this section is how these requirements and tools are implemented, and how they affect the resulting projects.

Requirements Imposed by EPA

P.L. 92-500 and the recent amendments set up a number of sub-programs and requirements on facilities funded under the Construction Grants Program. Some of these are listed in Table 5-2. Some are described in detail in this report, such as the state priority list activities and clearinghouses below, the Environmental Assessments and Cost-Effectivenss Analysis in Chapter 6, and the Basin and Areawide plans in Chapter 4. All, however, are among the considerations which have to be included in the facilities planning, design, and construction process; they are the way in which EPA determines what sorts of projects are acceptable for funding.

Any system which receives an EPA grant must provide for User Charges based on the proportional contribution of each user; must provide for recovery from industries of the capital costs which serve their portion of the flow; must consider alternative and innovative technology in planning, including land application, energy and water conservation options; must provide equal employment opportunity in construction, and buy American products wherever possible (as determined by the Administrator); and must meet numerous other requirements of the EPA. In some cases, however, implementing regulations have been slow to appear: this is most significant for the pretreatment requirements, where agencies such as the MDC have claimed that implementation of pretreatment without clear Federal guidance would result in a comparative disadvantage for industries in Boston compared to other regions. This is discussed further in the Sludge Report,* but similar difficulties have occurred with the other requirements of the program.

The EPA is currently developing guidance on the implementation of the requirements of the 1977 Amendments, in areas such as the consideration of alternative and innovative technologies and the Buy American provisions. Given the historical record in the study area, it appears unlikely that these programs will be implemented until final guidelines or regulations are promulgated: there is no incentive for the grantees to comply with new requirements which necessitate extra work and provide little gain. A few of the amendments, such as the definition that ICR applies only to industries discharging over 25,000 gallons per day, and the ability to discharge primary effluent to the ocean, have

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*Environmental Research & Technology, Inc. Phase II Report on Sludge Management in the Boston Metropolitan Area. Boston Case Study, to be released.

Table 5-2

CONSTRUCTION GRANTS PROGRAM REQUIREMENTS

- Compliance with State Priority Lists
- Compliance with Basin and Areawide Plans
- Clearinghouse Review at all stages
- Environmental Assessment
- Cost-Effectiveness Analysis and presentation of costs
- User Charges
- Industrial Cost Recovery
- Pretreatment of certain wastes and provision of a sewer use ordinance
- Consideration of alternative and innovative technology
- Buy American
- Public Participation
- Civil rights, relocation, and related social requirements
- Infiltration/inflow analysis
- Preparation of an Operations and Maintenance Manual
- Value engineering
- Multiple use of sites for treatment and recreation

proponents and will be welcomed. For example, the MDC has claimed that ICR would be too expensive because it covered too many industries: the new Act makes the system feasible. However, the new requirements for analysis or compliance to meet national goals will be implemented slowly. Since EPA provides the funds, it can impose its own requirements; local governments and the Commonwealth itself wish to do so. In most cases, this means that they will wait until EPA develops detailed final guidance on what it wants, and enforces compliance with those requirements. This response was shown in the past, on issues like pretreatment, collection sewer funding, and alternative selection.

Provision of Direct Assistance

A certain points in the Construction Grants Process, EPA directly assists the States and the grantee, or takes an active role in the steps being undertaken. One example, discussed in Chapter 6, is the Environmental Impact Statement process. EPA is responsible for meeting the requirements of NEPA, so if "the project is highly controversial or may have significant adverse environmental effects,"* EPA prepares an EIS. This may be done separately, or in conjunction with the applicant to provide joint preparation of the Step 1 plan and the Draft EIS. This process is discussed further in chapter 6; the most significant aspect at this point is that is requires considerable direct involvement by EPA in the facilities planning.

The other area where EPA is becoming directly involved is the review of plans and supervision of construction for major projects. Construction inspections have been part of the program throughout its history, but the recent agreement between EPA and the Corps of Engineers makes this effort much more significant. The MDC construction, for example, will receive detailed review by the Corps under the proposed agreement; Corps employees will provide resident engineering support during construction (for projects involving more than $50 million). Also, EPA has in other areas provided support in planning through resident engineers on-site by delegating a staff engineer to work with the applicant through the Step 1 planning period. This has been suggested as a useful part of the process for the MDC planning by various officials interviewed; it has not, however, been implemented as yet.

Given the past interactions between EPA and the MDC, it appears likely that EPA will be directly involved in the further planning and design work through its enforcement actions, the EIS process, plan review and construction inspection, and perhaps through direct engineering support and assistance. This involvement, however, is only significant for large systems like the MDC; for smaller plants, the EPA role is primarily one of review, to check compliance with the grant requirements. Its direct involvement in the smaller facilities in the region has been much less, with the Commonwealth taking the lead role for both the enforcement and guidance portions of the program for the smaller facilities. In fact, EPA turned over the grant review function to the Commonwealth in October, 1977.

The EPA tends to become involved only in the largest or most controversial projects. Projects which are neither large nor controversial seem to receive relatively little review from the agency, and this is reasonable, given its intended role in the NPDES, NEPA, and Construction Grants Program. In essence, deligation to the Commonwealth means that the state performs almost all of the review for most projects. EPA is involved for EIS's, major enforcement actions (like the MDC) and other large or difficult cases.

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*EPA Guidance for Preparing a Facility Plan. 1975.

EPA and Public Participation in Construction Grants

EPA is not required to perform any public participation activities by its involvement in the Construction Grants Program, beyond those arising through its NEPA responsibilities. However, the agency has developed a significant public participation program in the Boston area, directed at the evaluation of the MDC's proposed program.

While EMMA was not a facilities plan, and has served other roles as described in Chapter 4, it does have similarities to Step 1 planning. In fact, it is very possible that the MDC may request some Step 1 planning funds for the EMMA study, since it will reduce the work required in the later Step 1 analyses on individual facilities.

EPA's primary vehicle for public participation has been the Boston Harbor Citizen's Advisory Committee (BHCAC). The committee was formed to aid EPA in evaluating the program proposed in EMMA, and its activities have included review of particular projects, assistance in the public participation required under the EIS, and general discussion of the issues raised by the EMMA study and the courses which should be taken by EPA and the other agencies involved. The CAC does not seem to have any detailed goals, and is relatively short of assistance: they have requested staff support and training a number of times, but still do not generally have as much information as the members feel is required if they are to be an actual aid in decision-making.* The CAC has been concerned with areawide issues, and with the expected benefits and costs from individual projects. For example, they have requested answers to the following questions:**

"1. Data Base -- Qualitatively and quantitatively, what are the the major sources of pollution in Boston Harbor? (What is the current water quality status of Boston Harbor?)

2. Anticipated Results -- Qualitatively and quantitatively, what contribution to better water quality is projected from each major project? What is the evidence?

3. Alternatives -- Are there alternatives to the proposed program which meet water quality objectives, and are cost-effective and environmentally sound? (Note: they must be acceptable to the public as well). Examples are land disposal, offshore discharge, and greater emphasis on nonpoint source discharge."

To the best of our knowledge, the BHCAC have not received satisfactory answers to these questions, nor do they have the resources to develop the answers themselves.

They have attempted to broaden the issues with which they are concerned, especially in the area of water demand and supply. Several members of the committee would like to see further consideration of alternatives rejected during the EMMA planning phases. The public members involved seem to be genuinely concerned with both the overall and the detailed impacts of the proposed plan, on water quality and on the environment as a whole (including economics). However, without technical support, they are not being provided with enough information or support, so their role appears to be a token one at this time.

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*Boston Harbor Citizens' Advisory Committee. Minutes.

**Subcommittee Report, "Distillation of Questions Submitted by Members." September 19, 1977.

The committee also includes members from other agencies involved in planning, such as the MDC, the EOEA (and the Environmental Review Office), the Coastal Zone Management Program, and the MAPC Water Quality Project, in addition to EPA staff. These representatives play a relatively passive role, generally providing information or summaries of on-going planning work. At times, the committee has provided a forum for participants to find out about work going on in other agencies. This coordination may have been successful because the agency members of the committee have more information available to them than what is presented at meetings of this CAC. The role of the public members has been as protagonists who ask pointed questions. However, this role has also been limited because of a lack of information.

While EPA is to be commended for developing this means of public participation, as long as the Boston Harbor CAC is just a forum without real goals, and as long as the members receive most of their information through monthly meetings, it is unlikely that the committee will be able to participate actively in the decisionmaking process. Some communication and coordination will occur because of the meetings through interactions among groups of individuals, but public involvement of this form will not be able to address issues which are larger in scope than the location of an individual treatment plant.

The Priority List

One of the most important pieces of the Construction Grants Program is the state priority list, prepared by DWPC. This list describes the projects which may be funded in the current year, and ranks them according to their importance in water pollution abatement. It is related to the state Continuing Planning Process described in Section 303 of P.L. 92-500, and is guided by regulations which require that:

> "In determining which projects to fund the state shall consider the severity of pollution problems, the population affected, the need for preservation of high quality waters, and national priorities as well as total funds available, project and treatment works sequence, and additional factors identified by the State in its priority system. The list of projects to be funded should be developed in conjunction with the municipal discharge inventory but need not rigidly follow the ranking of discharges in the inventory. The net result should be a concentration of projects to be funded in high priority areas..."*

Compare this to the requirements of the Continuing Planning Process, which states:

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*40CFR 35.915(c)(1): See also PRM, May 13, 1977 on "Management of State Priority Lists."

> "...Before approving a Step II or Step III grant for any project for any treatment works under Section 201(g) of the Act, the Regional Administrator shall determine...that such works are in conformance with any applicable State water quality management plan...approved by the Regional Administrator...*

or with the Act itself, which requires that the Continuing Planning Process include those items discussed in Chapter 4 above, plus

> "...an inventory and ranking, in order of priority, of needs for construction of waste treatment works required to meet the applicable requirements of Sections 301 and 302.**

Therefore, the Priority List should be derived from the areawide water quality considerations which form the basis for the basin plans. The Priority List should also be affected by the 208 plan, since all projects funded after adoption of the 208 plan must be included in it. The priority list must also be subject to a public hearing (40CFR 35.915(f)), in an attempt to meet the public participation goals of the act.

According to numerous interviews, the Priority List in the Commonwealth is not developed from the basin plans, nor do we expect it to be changed by the 208 plans. The basin plans at present show a wide variation in their consideration of individual projects: some include Priority Lists for their basins, while others do not. There is no clear connection between the lists included in these documents and the actual state list. As for the 208 plans, Region I requires documentation of existing and proposed facilities to ensure that there is no conflict in funding.*** It appears, from the interviews, that the state Priority List is derived from professional judgment and the Municipal Discharge Inventory rather than from the basin planning process. Each year, a draft Priority List is prepared, depending on the likelihood that a project will be ready for funding, and on a scoring system including factors related to the type of project, the water body where discharge will occur, and similar criteria. This list is then published in newspapers in the Commonwealth, and a public hearing is held in Boston. Typically, the hearing will consider modifications of the list, which may shift a few projects by changing their scores. Some applicants and consultants seek to increase the priority for particular projects, but the overall list is modified only slightly (if at all) through the public hearings, and the ranking methodology has not been changed through the hearing process. Professional judgment in assigning scores for the various projects dominates the list preparation; there is no direct tie to the water quality mandated for each stream segment.

Guidance in Technology Selection

There has been considerable interest among the study area communities in alternative systems for wastewater management, including land application, septic tank management and septage disposal, and use of small-scale treatment system.+ For a number of reasons, the guidance provided by the Commonwealth has tended to eliminate such alternatives from consideration.

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*40CFR 130.31(b).

**P.L. 92-500, Section 303(e)(e)(H).

***Memorandum. Walter N. Newman, Chief, Water Quality Branch, Facilities Plans in 208 Plans. EPA Region I Office. June 2, 1976.

+See the local comments on MAPC Draft Basin Reports.

The Town of Weston provides a good example. Weston is a high-income suburb west of Boston, which was proposed under EMMA as a future member of the MSD. The town center has had problems with its septic tank systems, requiring development of a plan for abatement. Camp, Dresser, & McKee developed a plan which considered connection to the MDC system, as well as a subsurface application system involving large-scale septic tanks with soil absorption fields.* DWPC policy states that:

> "For small treatment facilities with flows over 15,000 gallons per day, the Department of Environmental Quality Engineering requires a secondary treatment plant with a rapid sand filter prior to subsurface disposal...
>
> In general, the Division does not consider a septic tank installation as a permanent method of wastewater disposal and considers this type of facilities [sic] of low priority for Federal and state funding."**

In other words, the proposed system would require secondary treatment before subsurface application if flows were over 15,000 gallons per day. For smaller flows, the system would receive low priority. The first requirement was answered by providing a design with four tanks, each under 15,000 gallons per day. However, DWPC's interpretation that the system would not provide a permanent solution has been a major problem in obtaining funding.

Weston has also had disagreements with EPA on alternative selection. One other option for the town has been connection with the MDC. If that option were taken, the Cost-Effectiveness Analysis allocates an annual capital cost for the MDC facilities of $3,500 to Weston, based on its proportion of total flow; this makes connection to the MDC appear cost-effective according to the EPA analysis. However, the MDC does not allocate capital cost according to flow, but rather according to population; the town would, in fact, pay $49,500 each year, and connection to the MDC would be more expensive than other alternatives. From a national viewpoint, EPA would save money if Weston joined the MDC; however, the community would face increased capital and O&M costs. The MDC has taken no stand on the issue: they are willing to accept Weston, but are not attempting to force the town to join.

The Weston facility plan has been significantly more complicated (and expensive) than most, because of the range of alternatives, and the interest in the community. The basic plan cost on the order of $50,000, compared to about $20,000 which would have been required for the conventional option of connection to the MDC. Since that time, however, there have been further costs for site evaluation, public participation, and negotiations among the town, CDM, DWPC, and EPA, and these have approximately doubled the total cost of the plan, to about $100,000.

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*Camp, Dresser, & McKee, Inc. Weston, Massachusetts Wastewater Facilities Plan. January 3, 1977 and supplementary correspondence. See also Chapter 6 of this report.

**DWPC Policy Regarding Septic Tank Installations. February 10, 1977.

The interviews have reported that guidance in alternative selection is becoming less strict, and that the communities are being allowed more options. In the past, it was reported that the state determined the alternative, requiring conventional sewers and treatment plants for grant approval. This policy, however, is being modified, with more concern placed on abating the probelm than on the specific alternative. The Division does require that the alternative be implementable, and must be convinced that it will work, but it is becoming more open to new systems, and providing less direct guidance on alternative selection.

It is still more difficult to get new technologies approved and on the Priority List than it is to implement conventional options, partially because DWPC lacks expertise in many of these new systems. This was a major reason why the initial expectations for the Weston step 1 plan were $50,000 rather than $20,000, and has also affected other cases, such as Sudbury/Wayland. The two towns have joined to propose a septic tank management program with a centralized septage treatment facility, and have received step 1 approval. The towns committed local funds to the planning, and prepared extensive documentation including a preliminary site design with the facilities plan, which greatly aided its review, according to officials interviewed. Such documentation may, in fact, be necessary if innovative or alternative technologies are proposed; since DWPC wishes to fund only plants which will work, and since innovative technologies will thus require significantly greater review, larger step 1 funding may be required. In this case, the burden fell on the towns to provide the extra funds.*

DWPC Involvement in Review

The reviews of plans and designs performed by DWPC are directed at compliance with the grant requirements; technical review is cursory. Emphasis is placed on theoretical soundness and the detailed operational characteristics are not generally considered. The review generally involves a few person-weeks of effort, checking that unit processes are sized correctly; elevations may also be checked, but pipe networks and controls are seldom inspected. More extensive review may occur with innovative processes, and not extend to the whole plant. This review is sufficient to approve a plant for Construction Grants under the conditions of the program; it is clearly not sufficient to ensure that a plant constructed according to the proposed plans and specifications will work as proposed.

DWPC's role in alternative selection appears to be changing, according to several interviews. For example, one interviewee stated that three years ago, the Division would tell the communities or their consultants what technology would be accepted (these only included convention alternatives). Recently, however, the policy has shifted, and the engineers overseeing step 1 are willing to accept any alternative which convincingly solves the pollution problem, with sufficient documentation. The next step, of entering the project on the Priority List, still appears to be difficult, but portions of the technology selection process are becoming more open to "innovative" and "alternative" systems.

Thus, the problem of getting an alternative system considered is no longer significant. The current limitations are:

- requirements that alternative systems receive much greater study than conventional ones;
- limitation of grants to the "most cost-effective" alternative only.

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*The Priority List criteria were revised after the close of the data collection for this study.

The latter limit applies not only to new technologies, but also to questions of regionalization, as shown by both the Weston and Westborough cases. Several of the grants officials interviewed also believe that large treatment works are likely to be cheaper and to operate more effectively than small ones, and this has been a concern in DWPC's endorsement of regionalization.

The Role of Consultants

Grantees under the Federal Construction Grants Program normally do not have sufficient staff or expertise to perform the necessary planning and design work in-house. Consulting engineering firms are hired by the grantee to perform these services, which include research, planning, selection of alternatives, design, supervision of construction and start-up of facilities. In addition, the consulting engineers generally have to prepare all of the documents necessary for the grant application and represent their clients in dealings with various regulatory agencies, and may be involved in other parts of the process. For example, the MDC contracted with Metcalf & Eddy to prepare an EMMA Management Plan to guide implementation.

The influence of the consultants in the overall planning process is a function of many local considerations including the size of the grantee, the degree of interest expressed by officials and citizens in which alternatives are selected, and the attitude of the regulatory agencies. In smaller communities, a single firm is frequently employed from the earliest stages of planning and performs all services necessary for the completion of a grant-supported project. For example, there are cases in the study area of a single firm doing all wastewater engineering for a town for twenty or more years. Larger grantees, such as the MDC, must depend on several consulting firms to provide necessary services, potentially increasing the role of the grantees in coordination and supervision of consultants. Where local opinion disagrees with the conclusion of the consultant during the planning phases, it is not uncommon for the grantee to hire a second or even third firm to evaluate the problem.* Motions for further study are often supported by interested parties simply as a means to avoid doing anything.

In general, the consulting firm has the responsibility of considering all the possible alternatives and selecting the one which in their professional judgment is best for the client community. The consultant also performs most of the direct interaction with the regulatory agencies, such as the DWPC and EPA. For example, in the Weston example used earlier, the correspondence related to cost-effectiveness was between EPA and Camp, Dresser, & McKee.** Metcalf & Eddy prepared plans for the MDC on management of the EMMA program, while CDM is the lead contractor on the combined sewer overflow Step 1 plans, aiding the MDC in supervising the work of the other consultants.

Consultants have also had a major role in the areawide 208 planning, particularly in the inventory of existing facilities and assessment of needs (CDM) and the industrial waste survey (M&E). The latter extended work performed at M&E as part of its responsibilities under EMMA, by adding the peripheral communities.

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*Examples in the area include both Acton and Weston.

**The involvement of these agencies in Step 1 planning is somewhat limited by the retroactive nature of the funding mechanism.

It was reported to us than in an average, conventional step 1 plan, the engineers would hold approximately six meetings with community officials (including one presentation to the town meeting), plus about three meetings with state officials. State interaction with the communities is more limited, and most telephone contacts are directly between either the engineers and the local sewer board, or the engineers and the state officials.

The use of alternative systems may be limited by the consultants. Several interviewees reported that the lower capital costs of alternative systems -- and the corresponding reductions in engineering fees -- made it difficult for these systems to be considered objectively, except when there was strong local pressure. Since residents in most communities in the area have shown little interest in wastewater planning, the result has been limited consideration of technology options.

5.3 PROVISIONS FOR QUALITY CONTROL AND DESIGN REVIEW

Even aftor the step 1 plan is completed, and all parties are in agreement on the plan, there remain steps 2 and 3. The plant must be designed, contractors found, and construction performed before it can operate to abate pollution.

Quality control has been a problem, in the study area and the rest of Region 1. EPA officials state that they do not do any detailed review of the step 2 design. The DWPC performs a more detailed review of plans and specifications, but is limited to a few person-weeks of effort, which usually includes an analysis of the language of the specifications, plus a review of the capacities of the unit processes, and their relative elevations; detailed analyses of the pipe networks and controls are seldom (if ever) performed.

A number of consultants provide extensive internal quality control, including careful analysis of plans and designs by personnel otherwise unconnected to the project. Some of these quality control procedures may involve Value Engineering by special time. This procedures, which gives independent review in an attempt to reduce costs, is required by EPA for large plants.

Interviewees from these firms report that the allowable fees under the construction grants program pay for these quality control procedures. They also claim that limits on fees act to reduce the funds available for quality control. In other firms, extensive internal control has never been provided.

According to both consultants and community officials, the local communities seldom review the designs in any detail, and generally assume that the work of the engineer, approved by the state and EPA, will be of high quality.

Consultant qualifications have been an issue in deliberations at the EPA and state levels. Communities do not always hire consultants who are fully qualified to do the work, nor does the market provide perfect information about the ability of particular firms. Since the DWPC and EPA have better information, some officials feel that they should have the opportunity to review and approve the selection of consultants by the grantee, with the applicant required to submit a statement of qualifications of the chosen consultant.

After the plan is completed, disagreements between the community and its consultant may occur, and are difficult to resolve. The consultant received his major fee at the end of step 2, while acceptable performance is required before the community receives its final payment under the step 3 Construction Grant. Therefore, design errors made by the consultant may result in higher local costs, with little recourse. According to EPA officials this has been a problem in the study area, and is the subject of current litigation. Under the Clean Water Act of 1977, EPA is empowered to participate in such suits on behalf of the communities.

There is, then, little assurance that the plant will actually work as planned. Numerous interviews provided anecdotes about plants which have failed because of design errors in the region, and this is not surpsising, since there is no requirement for review to make sure that they will operate correctly. EPA has delegated its review role to the state, in large part; the state review is limited to a few specific topics; review is voluntary for the consultants; and the communities lack both interest and expertise. The various reviews ensure that the step land 2 reports meet the grant requirements, but not that they will work.

5.4 CONCLUSIONS AND RECOMMENDATIONS

Enforcement and Construction Grants

Our major conclusion in this area was that enforcement has been used to date primarily to ensure that facilities are built, since that has been the major priority of the program. It appears, from very limited evidence, that this is changing, and that there will be more emphasis on enforcement in support of operations; this is analyzed further in Chapter 7.

A related conclusion is that enforcement can be delayed by progress towards obtaining a construction grant. As long as the community appears to be working on its grant, no further enforcement actions are taken.

This appears undesirable to us. The objective of the process is water pollution control, and the grant program is supposed to be only an attempt at assistance; therefore, enforcement should have higher priority. A community under enforcement currently has an incentive to make the minimal acceptable progress in obtaining its grant; all delays in the grants process favor it. Independent enforcement would give it an incentive to obtain a grant quickly, since it would otherwise have to pay fines or build the plan itself.

We recommend, therefore, that enforcement be made independent of construction grants, and that delays in obtaining grants no longer be used as excuses to delay enforcement. One possibility might be the imposition of fines on communities which did not abate their discharges by the dates required in their permits. It might also be possible to provide some grant assistance after the fact to communities which proceeded with their own construction in advance of grant approval. These are details, however, and our major recommendation does not depend on them.

The Priority List and Water Quality

The Massachusetts Priority List is not directly connected to the remainder of the Continuing Planning Process, nor to the 208 plans. Water quality considerations enter through the judgment of DWPC staff members, based on surveys of communities and other data. The basin plans and modeling efforts are used for the determination of where AWT is required, but generally are not considered in the provision of other treatment or the development of sewer service areas. In addition, the public participation process, which could potentially bring these considerations back into the program, has only been minimal, and has not affected the priority list to any significant degree.

We recommend that the basin plans and 208 plans should be much more closely related to the development of the Priority List than they are now, so that the goals of the Act can be met.

Local Planning and Alternatives Analysis

As described in Section 5.2, there are numerous requirements placed on the communities which they must meet to obtain construction grants. DWPC and to a lesser degree, EPA also takes a direct interest in the construction grants process, and may require that certain options be evaluated or even selected. There are three types of imperfections which may result from the multiplie institutions involved in the process:

- Water pollution control may occur slowly.
- The set of technologies considered and chosen may be reduced.
- The communities may have a limited role in this choice.

With respect to the speed of the process, it is clear nationally and in the region that industrial abatement has proceeded faster than municipal. Numerous delays are possible, and it simply takes time to meet the requirements of each step. Cases exist such as Concord, with a few years delay while regionalization was studied; or like the MDC, with a ten-year abatement schedule which is not currently being met. The Construction Grants Requirements, combined with slow enforcement and limited local incentives to abate, has meant slow implementation of pollution control. For example, Chapter 4 showed 51 communities in the area receiving step 1 grants to date, with only 27 receiving step 3 grants.

We do not have any recommendations on how to speed up the process significantly; therefore, we believe that the time required should be recognized, as it has been in the 1977 Amendments, and the ECSL for the MDC.

We believe that the set of technologies considered in facilities planning is much more limited than the available options which would abate the pollution problem. DWPC has explicitly limited the technologies it will fund in the past, and currently requires much more documentation for unconventional options than for conventional ones. It does not have the expertise to review these systems without such proofs, and the incremental costs are paid by the communities. Funding of alternative systems is not assured, given agency policy on septic tanks and related options.

In addition, the engineers have an incentive to propose conventional systems, since they are capital intensive and lead to larger fees than the alternative options. The result of these two forces has been no consideration of unconventional alternatives except in areas where the communities have required their evaluation, such as Weston, Sudbury/Wayland, and Acton. Areas which have not objected to the conventional approaches have received them.

We believe that DWPC is becoming more aware of the unconventional alternatives, in response to pressure from the communities and national initiatives, such as PRM 77-8 and the 1977 Amendments. However, more technical expertise in these options will be required at both EPA and DWPC if they are to be effectively evaluated, and we recommend that this support be provided by training and technical assistance. In addition, EPA and the Commonwealth should actively implement the requirement of the new Act for

> "The Administrator shall not make grants...unless the grant applicant has satisfactorily demonstrated...that innovative and alternatives... and techniques...have been fully studied and evaluated.**

and attempt to eliminate any remaining barriers to the consideration of proven alternative technologies.

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*PRM 77-8: "Funding of Sewage Collection Projects," June 21, 1977. See also Sections 12, 14, 16, and 17 of the 1977 Clean Water Act (P.L. 95-217).

**P.L. 95-217, Section 12.

The role of communities in the planning process is limited. Most communities in the study area have been willing to accept the recommendations of their consultants -- and, in some cases, DWPC -- for conventional systems, and have proceeded through the grants process to construction. Some, however, have been advocates of unconventional technology, or resisted DWPC's decisions on regionalization; these communities include Acton, Concord, Sudbury/Wayland, Weston, and Westborough and they have had limited success.

These communities have had two types of problems with the state and Federal agencies: the first is difficulty in getting their technologies accepted, but this seems to be changing. The second problem is that they often want to invest in an option which is not "cost-effective" from the viewpoint of EPA or the state. Since current proceduree is to fund only the most cost-effective option, the local government is not allowed to select a technology or plan which is more expensive. The only stated reason for this limitation in any of the documents or interviews is that EPA's funds are limited, and should be spent wisely -- grants for the most cost-effective alternative will ensure efficiency. Therefore, the cost-effectiveness criteria determine which project can be funded, and the community builds that option.*

This requirement has contributed to numerous delays, in cases such as Weston and Westborough. There are good reasons why the grant amount should be tied to the most cost-effective alternative, as described above. However, we see no reason why the most cost-effective alternative must be the one that the community builds.

Consider the case of Weston, where EPA concluded that connection to the MDC was cost-effective, and the town desired to build its own system. Under the current process, Weston is attempting to convince EPA that it is right, and provide more documentation for its own alternative. Lengthy delays occur as the issues are negotiated, and the town may wind up with an undesirable option forced on it, as the only one acceptable to the grants process.

We recommend that the grants process be changed to allow the communities more flexibility, by divorcing the grant computation from the chosen alternative. Under our proposal, Weston could choose any of the alternatives studied which would successfully address the water pollution and public health problems. However, its grant would be based on the most cost-effective of these options. Say, for example, that MDC connection cost $3 million Net Present Value, and that building its own system would cost $4 million,**with all the capital costs grant eligible in both cases. Then the town could build its own system, and would receive an EPA grant for 75% of the capital cost of connecting to the MDC. Weston would be allowed to incur extra local costs to gain the alternative it desired, while still getting assistance from EPA.

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*Note that selection may depend on other factors, such as environmental impact. In some cases; however, cost-effectiveness dominates, at least in the study area. See 40CFR 35, Subpart F, Appendix A.

**These figures are not accurate, but only provided as a hypothetical example.

Under the current system, the town has three options:

- build its desired system, without any grant assistance;
- build the system determined to be cost-effective, whether or not it is preferred locally;
- attempt to negotiate, and/or delay the process.

Our recommendation would provide a fourth:

- build its desired system with reduced assistance based on cost-effectiveness.

We believe that this option would reduce delays in a number of cases, and that it should be implemented by EPA so that specific local issues can be addressed by the grantees, who will have to operate the systems once they are installed.

Quality Control of Design

The conclusion on quality control can be divided into two parts:

- There is no requirement that quality control be done.
- Quality control is necessary to ensure that the plants abate pollution.

The latter point has not been documented, except in interviews; we belive, however, that the interview data are strong, and have concluded that more quality control is necessary. The former point depends on the interviews, supported by descriptions of the activities at each stage in the review process.

Given these two conclusions, the question is how to improve the review function. There are a number of potential remedies which could provide adequate review, ranging from revised regulations to existing legal powers. For example, the Federal government requires Value Engineering by independent contractors on projects estimated to have total costs over $10 million. VE is directed at controlling costs, through independent review and modification of designs. For large projects, the Corps of Engineers is also going to provide a review role. Value Engineering is encouraged for smaller projects, but not strongly (at least in the study area). While the VE program is directed primarily at controlling costs, the detailed review of the design also tends to catch other errors; review starts when the design is 20% to 30% complete, so that major problems can be remedied at minimal costs. Since small communities with limited expertise in choosing consultants or reviewing their work have often been the victim of design errors in the study area, a requirement for Value Engineering of small plants could remedy the problem, or at least eliminate some of the major errors. Communities should be explicitly informed of their rights to receive VE funding, and their right to request performance of the VE function by an outside party. The VE effort could be funded as part of the State Management Assistance program provided under Section 26 of the 1977 Clean Water Act. Alternatively, the DWPC could implement its own detailed review of designs and specifications, working with the consultants throughout the design process.

A third method involves the approval of consultants and VE teams. The DWPC or EPA could require that consultants submit qualifications to perform the proposed work, and could exercise a limited veto over acceptability of each firm to receive Construction Grant Funds. In New Hampshire, for example, the state is a party to all contracts, and both assists the communities and exercises control over the process. A more limited program would still give the communities freedom in choosing consultants, but the states could at least provide assistance on request. This would be particularly valuable for small communities; the 1977 Amendments give the states the power to prepare facilities plans for such communities (Section 26), and this could include both assistance in selecting consultants and in reviewing the results.

Several regulatory officials have expressed concern that consulting engineers be held financially accountable for the results of designs. The logic is that a financial (as well as professional) stake in the outcome of a project may encourage more rigorous in-house review. Some firms in fact, do make it a practice to make their final payment from the grantee dependent on final approval of the work by the regulatory agency. EPA should consider the advantages and disadvantages of incorporating either a mandatory or voluntary fee retention policy for consultants into the program. The percentage of the fee retained could be similar to the percentage of construction grants funds withheld until final inspection of the facilities. Consideration should be given to the possibility of withholding this percentage from the engineering fees under both the Step 2 and 3 grants.

The 1977 amendments authorize EPA to assist grantees in suits against design engineers, and this power could be exercised where poor designs have resulted in poorly-functioning facilities. However, preventive measures should be emphasized in order to minimize the number of poor designs which get built to limit the impacts of poor design on water quality and avoid the costs of litigation and repair.

Our preference in this area is for incremental changes which will aid the community, while still allowing the engineers to perform their work effectively, and under the direction of the grantee. Therefore, we strongly favor support of the VE program, and its extension to smaller communities, supported by somewhat expanded Step 2 funding. We feel that DWPC should be able to comment on the qualifications of consultants, but should probably retain the right of approval over VE groups, to ensure high quality comments. We would also encourage communities to favor engineering firms who allow portions of their fees to be withheld until final inspection and approval of the plant, but would not require this. Finally, EPA should use its power to act as a party in suits where system design is inadequate, and where there is no other solution: if the consultants have the responsibility to prepare adequate systems, it is they who should pay for their inadequacies, not the federal taxpayer or the local community. While this will lead to increases in insurance costs and in overall program costs, its major result will be to provide some incentive for superior future performance, and this is desirable.

At present, many of the communities seem to feel that state approval of a Step 3 grant means that the plant will work as designed. Thus, our final recommendation with respect to quality control is that the state and EPA should make it clear to communities where the responsibility lies, and what review is actually done by the regulatory agencies. This can be combined with a description of the level of

review which is desirable, and the costs to the community of design inadequacies. Any community which wishes to minimize costs will have a strong incentive to ensure adequate designs.

CHAPTER 6

IMPACT ASSESSMENT AND PRESENTATION

According to the procedures of the Construction Grants Program, impacts are to be assessed and the most cost-effective and environmentally sound alternative is to be chosen. The chapter on "Plan Selection" in the EPA Guidance for Preparing a Facility Plan (Revised May, 1975) states that:

> 8.2 Comparison and Ranking of Proposals
>
> Plan selection will involve making choices among alternatives based on a display of the significant costs, effects, and benefits of each. Common units are lacking for measuring environmental, social, economic, and other costs, and therefore, selection of the most cost-effective alternative requires careful judgment...
>
> The alternatives may be ranked after they are displayed to aid final selection of a plan.
>
> The following are suggestions on the ranking procedure:
>
> a. Environmental Effects: All significant primary and secondary effects should be weighed to derive a value judgment as to the net overall effect of each alternative relative to other plans. Alternatives which have secondary effects with a high potential for contravening an environmental or land-use statute or regulation, or plan imposed by such statute or regulation should be ranked below those which do not.
>
> b. Monetary Costs: Total costs should be the primary factor in determining the cost-effectiveness of the plan.
>
> c. Implementation Capability: The ability of and agreement among the State, regional, and local governmental units or management agencies to implement the alternatives should be weighed carefully. The necessary institutions must exist or be created in time to carry out the plan, and the local governmental unit must be capable of bearing the local share of the costs...

This chapter is directed at the selection process. It examines the procedures used for preparing and presenting cost and environmental information, and how the information is used to select the most cost-effective alternative. This alternative is defined as:

> "the waste treatment management system determined from the analysis to have the lowest present worth and/or equivalent annual value without overriding adverse non-monetary costs and to realize at least identical minimum benefits in terms of applicable

Federal, State, and local standards for effluent quality, water reuse and/or land and subsurface disposal."*

According to the EPA guidance, if the most cost-effective alternative can be identified, it should be chosen. The guidance, however, requires that the alternatives meet standards, and that non-monetary (environmental) costs be included in the analysis. Construction Grants funding is based on this cost-effectiveness analysis, and on the environmental reviews which accompany it. EPA performs a major Federal action when it gives a construction grant, so the requirements of NEPA must be met. The Regional Administrator is, therefore, required to determine whether an Environmental Impact Statement should be prepared for each project. The Regional Administrator can make this determination during or at the completion of the Step 1 process.** Figure 6-1 shows a rough schematic of how the process is supposed to work, from completion of the Facility Plan to the start of Design. The process for environmental review of 208 plans is similar.

There are a number of uncertainties about this process, and they have been important parts of wastewater planning in the Boston area. The major issues have been related to the decision of whether an EIS is required for a particular project, the role of the potential grantee in preparation of the EIS, and the impact of the EIS on selection of the desired alternative. In addition, the financial structure of the MDC and the requirements of EPA's Cost-Effectiveness Analysis Guidelines have a major impact on projected costs, and potentially on the selection of alternatives.

This chapter analyzes the effects of Federal actions and guidance related to the assessment of environmental and economic impacts. Section 6.1 considers the issues related to environmental impact assessment, while Section 6.2 evaluates the projected economic impacts of the proposed EMMA plan, and the effects of various policies on those impacts. Finally, Section 6.3 presents our conclusions and recommendations about this portion of the process.

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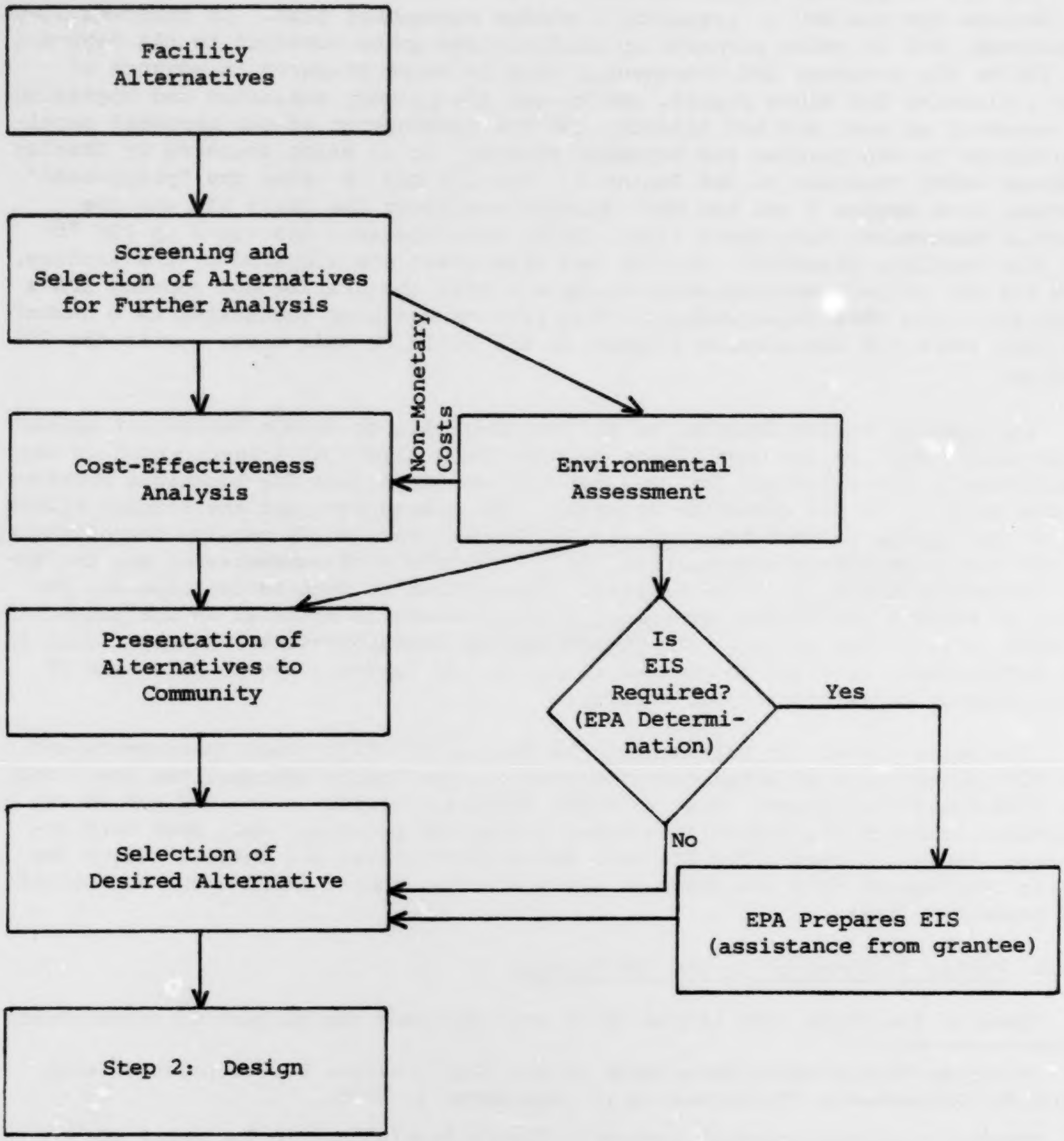
*EPA. Cost-Effectiveness Analysis Guidelines. Appendix A to 40-CFR-35.

**EPA. Guidance for Preparing a Facility Plan. Chapter 7.

Figure 6-1

IMPACT ASSESSMENT PROCESS



Facility Alternatives
Screening and Selection of Alternatives for Further Analysis
Non-Monetary Costs
Cost-Effectiveness Analysis
Environmental Assessment
Presentation of Alternatives to Community
Is EIS Required? (EPA Determination)
Yes
No
Selection of Desired Alternative
EPA Prepares EIS (assistance from grantee)
Step 2: Design

6.1 THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

There are three major EISs in preparation in the study area: the EIS on primary sludge management (draft released 1975), the EIS on the EMMA treatment plants, and the EIS on the 208 plan (draft in preparation). In addition, locally-prepared Environmental Assessments have been prepared on sludge management, EMMA, the individual 208 basins, and on each Step 1 plan.

The EIS on primary sludge management was an outgrowth of the work by Havens and Emerson for the MDC in preparing a sludge management plan. It followed Step 1 planning, and is being prepared by EcolSciences under contract to EPA Region I. The EIS on the proposed MDC Treatment Plants is being prepared in advance of Step 1 planning for those plants, and covers the primary expansion and upgrading to secondary at Deer and Nut Islands, and the development of the proposed satellite plants on the Charles and Neponset Rivers. It is being prepared by Greeley & Hansen under contract to EPA Region I. The 208 EIS is using the "piggy-back" process, with Region I and the MAPC jointly preparing the Draft EIA and the Areawide Wastewater Management Plan. Under this process, described in PRM 75-31* (for facility planning), the EIS and Assessment are prepared by the grantee, with the EPA project manager working closely with the grantee and showing EPA's compliance with NEPA requirements. This process has been successful in a number of cases where the decision to prepare an EIS could be made early, as in the 208 program.

The quality of the assessments and the Draft EIS on sludge management appear acceptable: EPA and its consultants perform the analysis at a level which is not significantly below average for EISs reviewed at USR&E, and the technical problems in the analysis do not appear to be major. The assessments and the Primary Sludge EIS do not appear to meet the proposed CEQ Regulations, which require concentrating on the most significant impacts;** and do not provide good summaries of all the major impacts from the projects; instead, they either attempt to consider all impacts in ranking procedures, or simply provide masses of material on the projected impacts, with little analysis or preparation for decisionmakers. However, this is not surprising; it would be unusual if any set of randomly chosen EISs were of significantly higher quality or utility.

The major concern of this section is the way in which these assessments and the EIS process have affected decisionmaking in the Boston metropolitan area, and the effect has been large. The two major effects have been increased public involvement, through the channels provided in the EIS process; and, even more important, increased control by EPA over which alternatives are chosen. Since the public involvement is a precursor to EPA's actions, public involvement activities are presented first.

6.1.1 Public Involvement in the EIS Process

Each of the three EISs in the study area has been the subject of considerable public involvement, both during the development process and (in the one case so far) in comments on the Draft statement. This public involvement can not be separated from overall public participation in the planning processes which prepared the assessments. It would be impossible to determine which portions of public participation in the 208 process or the EMMA plan were related specifically to environmental assessment, nor would it be meaningful. On the other hand, public participation in the preparation of the Sludge EIS was significant, and public participation in the EIS on the proposed MDC Treatment Plants is extensive and extremely important.

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*Program Requirements Memorandum 75-31, "Facilitating EIS Preparation with Joint EIS/Assessments (Piggybacking)." September 9, 1975.

**Council on Environmental Quality. "Draft Regulations to Implement the National Environmental Policy Act" in Bureau of National Affairs, Environmental Reporter. Vol. 8, pp. 1291-1310, 1978.

Sludge Management

The Draft EIS on Sludge Management was prepared primarily by EPA and its consultants, with some involvement by the MDC. After the statement was released, however, it met with numerous comments at two public meetings, at the hearing, and in writing both directly to EPA and indirectly through the State of Massachusetts. For example, the New England Consortium on Environmental Protection prepared comments for EOEA, which were then submitted. Ever since the Draft was released, there has been activity seeking to increase the range of alternatives considered, to affect the analysis procedures, and to revise the proposed alternative. For example, state pressure led to the analysis of coincineration, which was not previously considered. This statement is discussed in some depth in the ERT report on Sludge Management.*

Treatment Plants

The EIS being prepared for the proposed treatment plants of the MDC (Deer and Nut Islands, and the satellite plants on the Charles and Neponset Rivers) has been the focus of a large public involvement process. While the Boston Harbor Citizens' Advisory Committee was created by EPA for general review purposes (See Chapter 5), much of its most significant effort has been related to treatment plant planning. EPA has initiated other public involvement activities, such as open meetings and two Site Evaluation Committees for the satellite plants which have worked in EIS development. More meetings are planned after the Draft is released.

EPA officials feel that this public participation activity is useful because treatment planning is controversial, and because a careful program of public involvement may improve the decisions which get made on sensitive issues. Several EPA officials said that there were technical questions about the continued suitability of the Nut Island site, but that the strong public opposition to expansion and fill there made moving it almost certain. EPA also believes that the decisions of its Site Evaluation Committees on the location of satellite plants should be final.

The EIS process began in November, 1976, and the first public workshops were held at four sites in early 1977. At each, types of alternatives were reviewed and considered by workshop participants, with specific questions answered in small group sessions. Later in the spring, another series of workshops was held, with more specific information presented, and detailed responses requested. An EIS newsletter was also initiated, and the Site Evaluation Committees formed, based on the MDC committees under EMMA. In December, 1977, the Site Evaluation Committee for the Mid-Charles recommended a site in Dedham (which was not represented on the committee) as the prime alternative, with a back-up site for a smaller plant in Framingham. A third series of public meetings is planned following the release of the Draft EIS, and in advance of the formal public hearing on it.

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*Environmental Research & Technology, Inc. Phase II Report on Sludge Management Planning the Boston Area; Interagency Case Study to be released.

The need for and location of the satellite plants have been major public issues for the EIS. Concerns for overall cost-effectiveness, such as those stated by the Boston Harbor CAC, have been relatively rare. Instead, the major public concerns have been the location of the satellite plants and the relocation of the Nut Island facility. In the Neponset basin, the concern has taken the form of a desire for compensation; in the Mid-Charles, water quality issues have been stated, along with the objective of locating the plant away from the riverbank. In the Quincy area, harbor fill has been very important, but the ability of the MDC to operate a treatment plant correctly has also been a major public issue, given the performance of Nut Island; chronic local environmental impacts such as odors and beach pollution are the worries, rather than the catastrophic failures which concern the Mid-Charles communities.

One complicating factor for the Mid-Charles plant has been the water quality modelling for the EIS, which has significantly shifted the plant's flow and discharge point. While nutrient balances and other pollutants have not been considered,* even dissolved oxygen sag models show major impacts from the flow of the proposed satellite plant. This led in the summer of 1977 to moving the proposed discharge point for the plant from the Cochran Dam to the South Natick Dam, and may lead to elimination of the satellite plant entirely by the time the EIS is completed.

There have been continuing problems with the EIS, related to operation of the site selection process. Our understanding of the situation, however, is that EPA has attempted to gain valuable information from the Site Evaluation Committee, though it has not always coordinated with them at important finctures, such as the decision to move the discharge point and locate new sites. The agency honestly seems to be attempting to use the public participation in its decisionmaking. A comparison of the Site Evaluation Committee composed of community representatives, and the Boston Harbor CAC is instructive however: the Site Evaluation Committee has a specific role, and has received significant support from EPA in its deliberations. There is a well-defined goal, and the issue is specific, and important to a large number of people in the immediate area. Public interest is high, and EPA's involvement reflects that interest, to a degree.

The consideration of overall alternatives in the EIS, and the levels of public interest in issues outside the treatment plant sites, appears to be limited. As described in Chapter 5, the Boston Harbor CAC has expressed some concern with these issues, and it has been directly involved in the EIS. However, it appears that the consideration of alternatives in the EIS is generally limited to plant locations, from the information received to date. Therefore, the major involvement has been directed at siting decisions, compensation, and related issues.

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*ERT. Water Quality Goals and Objectives, Phase II. Boston Case Study to be released.

6.1.2 The De Facto Role of the EIS in Planning

Environmental impact statements in the area have been used for planning, through analysis of an expanded set of alternatives beyond those contained in planning documents. For example, in the EIS on Sludge Management, EPA has modified all the alternatives from the Step 1 plan, and is considering new options such as co-incineration at either existing or new facilities.* Even if the Final EIS recommends incineration, plans for ash-handling and heat recovery have been modified by the EIS process, and the facility will be significantly different than that planned originally by the MDC. EPA officials have stated that the EIS recommendation will be the only option for which funding will be available under the construction grants program.

The EIS on treatment plants appears to be modifying the EMMA alternatives to a lesser degree. The major concern has been with the location of the various treatment plants and their discharges, with the Charles River discharge point moved because of analysis in the EIS. The satellite plants may also be eliminated in this plan, which is contrary to EMMA recommendations, but was studied as an EMMA alternative. Processing and treatment technologies have not been studied in depth, except for sludge management, and the alternatives have included the locations of primary and secondary treatment (and AWT, for the satellite plants), but not ocean discharge.** One of the most interesting issues for this EIS is the EPA decision to prepare it in advance of the step 1 plan, rather than concurrently ("piggybacking") or after plan submission, the usual procedure. According to EPA:

> The Regional office has concluded that a comprehensive environmental impact statement must be completed in conformance with Section 102(2)(c) of the National Environmental Policy Act of 1969, before construction can begin on the major items set forth in the MDC's permit schedule.***

However, no information is provided on why the agency decided to prepare the EIS first. According to the interviews, EPA officials concluded that they had enough information in EMMA to prepare the EIS. It is also clear from the interviews that there have been major conflicts between EPA and the MDC about the EIS and the overall planning process.

This conflict is viewed differently in various agencies. In EPA, some interviewees felt that the EIS on the Treatment Plants was, in essence, doing Facility Planning. The EIS appears specifically to have been inserted in the planning process before Step 1 to provide a measure of control over what alternatives get considered and chosen. At the MDC, on the other hand, this involvement is clearly viewed as inappropriate meddling, with EPA leaving the grantee no alternative but to accept its decision; funding does not appear to be forthcoming for any option besides the one recommended in the final EIS.+ The EIS is not a document disclosing environmnetal impacts, but a document which , according to those interviewed, either allows EPA to:

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*ERT Phase II report on sludge management, op. cit.

**Scope of work, EIS to Consider the Upgrading of the Existing Primary Treatment System of the Metropolitan District Commission. Summer, 1976.

***Ibid., p.4.

+This is speculative, since there have been no Final EISs prepared in the area; however, it appears to be the belief of those interviewed.

- control the planning process; or
- ensure that the most environmentally sound alternative is chosen;

with different people and agencies taking different sides of the question.

The EIS on the Treatment Plants has had a role in the enforcement actions. It was initiated as part of the process which developed the ECSL, and was included in the compliance schedule. However, it has been delayed over a year because of difficulties in Site Evaluation and changes in the alternatives under consideration; this has affected the MDC's schedule for facility planning, and been the subject of enforcement negotiations.

Analysis of Alternatives in the EIS Process

The EMMA plan considered the following concepts:

- upgrading of existing systems at Deer and Nut Islands;
- creation of five additional regional systems and contraction of Deer and Nut Island service areas;
- Maximum expansion of the Deer and Nut Island service areas;
- Decentralization of treatment;
- Decentralization plus land application.

In addition, it analyzed several alternative satellite plant options, and alleviate technologies for treatment at Deer and Nut Islands. The set of options analyzed in the EIS is much more limited, with the statement of work directing the effort at four major topics:

- two satellite plants vs. treating all waste at Deer and Nut Islands;
- removing all facilities from Nut Island to a nearby site;
- conflicts between wastewater and prisons planning at Deer Island;
- technologies for sludge management.

Since the sludge topic is simply a continuation of the work in the sludge management EIS, the EIS on treatment works is primarily an exercise in facilities planning and location, for a limited set of options. The other portions of the EMMA plan are not being considered in this EIS, though the Combined Sewer Overflow projects may require an EIS after the step 1 planning is done. Alternatives such as land application and ocean discharge have been eliminated, with interviewees arguing that they are not cost-effective (for land application, given EMMA) or not allowed under P.L. 92-500 (for ocean discharge). These scope of work decisions were made by Region 1 officials concurrently with the ECSL negotiations, and show the EIS to be used specifically for planning facility locations, rather than for a detailed environmental review of all the alternatives.

The issue of ocean discharge deserves some elaboration, given the recent Clean Water Act Amendments which allow primary treatment only, in some special cases with ocean discharge. When the EIS scope of work was prepared, EPA concluded that P.L. 92-500 required secondary treatment for all discharges, so that primary treatment, whatever its impacts, was not an "alternative" to the Federal action. NEPA, however, states that the agency should

> "study, develop, and describe appropriate alternatives to recommend course of action..."*

and the CEQ Guidelines expand on this, by suggesting that agencies consider

> "alternatives to the proposed action, including, where relevant, those not within the existing authority of the responsible agency."**

On the other hand, EPA's own guidance calls for the EIS to

> "develop, describe, and objectively weigh feasible alternatives to any proposed action..." (emphasis ours)***

This inconsistency between the EPA Regulations and the CEQ Guidelines is the rationale for Region I's elimination of ocean discharge from consideration as an alternative to the proposed action of secondary treatment.

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*National Environmental Policy Act, Section 102(2)(D).

**CEQ Guidelines on the Preparation of Environmental Impact Statements, 40 CFR 1500.8(a)(4).

***40 CFR 6.304(b).

6.2 EVALUATION OF ECONOMIC IMPACTS

6.2.1 Presentation of Costs and Public Reactions

Wastewater management is expensive, with significant costs borne by the consumer, the Federal taxpayer, and the local taxpayer. The consumer pays for industrial pollution control through increased prices; the Federal taxpayer must cover the $4 billion or more expended annually in the construction grants program; the local users must pay for the remainder of construction grants, along with the costs of operating and maintaining the water pollution control system once it is built.

In many cases, these costs are extremely high. Local costs alone have often reached $300/household annually for new systems in rural areas,* and even existing systems may double their assessments in attempting to meet standards imposed since their construction. It would seen reasonable to expect residents to be concerned about these costs, and to attempt to reduce them where possible.

At least in the Boston area, however, this concern does not seem to be present in the planning stage.** There is little interest by the public in the current costs of wastewater management, and just as little in how the costs will change when major construction programs are implemented.

Presentation of Costs

The EMMA summary report and the financing volume both contained data on the costs of the various alternatives under study, and an allocation of costs to communities for the recommended plan (including expansion of the system to 51 communities). These allocated costs were presented to the communities at public meetings.*** However, they did not receive much comment. No presentation of costs per household or per thousand gallons of flow was made, though information on the population and industry served was available for analysis. EPA's requirements for such presentation were not in effect at that time, and would not have applied to EMMA in any case (See Chapter 4).

The treatment plant EIS currently under development by EPA will reportedly provide information on the per household costs of treatment plant development at Deer and Nut Islands, and at the satellite plants. Data on total and annual capital, O&M and energy costs were presented to the Site Selection Committee, for example. In addition, such information must be contained in all future step 1 plans according to EPA requirements.[+] However, these estimates will be on a piecemeal basis, presenting costs for single projects or small groups, and the total system cost borne by MDC member households will never be estimated or presented to the public under current plans.

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*Dearth, K. "Current Costs of Conventional Approaches" in Proceedings of the National Conference on Less Costly Wastewater Treatment Systems for Small Communities. April 12-14, 1977. U.S. Environmental Protection Agency.

**Chapter 7 describes public reaction to high operations and maintenance costs.

***EMMA, Volume 14, Public Participation, pp. 7-8.

[+] EPA Program Requirements Memorandum 76-3, "Presentation of Local Government Costs of Wastewater Treatment Works in Facility Plants." Aug. 16, 1976.

The 208 plans for basins in the region include estimates of the costs of major sewer investments (pipes over 15") and of wastewater management through continued use of on-site systems. These costs are on a town-by-town basis, and are not broken down to per household costs for users of various system components (septic tanks, package plants, sewers and treatment plants). No estimate of the expected costs of land use controls and other non-structural techniques for sensitive land protection was performed.

Public Reaction to These Cost Estimates

The level of public response to these cost estimates, or even to the proposed $1 billion for the EMMA plan as a whole, has been minimal. At the EIS hearings, a common public response has been "I don't care how much it costs, I just want the best possible system." At the very least, concern has been with cost-effectiveness, not with total cost: the main issue is how the system will work, not how much it will cost. But, the closer a project comes to implementation, the more local it appears and the higher the concern with costs. In areas where new systems have been implemented, cost has been a major concern (See Chapter 7); and it is also significant in the alternatives analysis for Weston. (Chapter 5).

Some public comments are reported from the EIS meetings about system costs, but the meetings have generally been concerned with other impacts, such as local siting. There has been concern by satellite plant communities with compensation: if a town accepts the satellite facility, particularly on industrial land with good services, these officials feel it should be compensated, at least through payments in lieu of taxes. This concern was expressed primarily by officials in the Neponset Basin. It has been raised at EPA meetings on the treatment system EIS, where MDC has not participated. EPA's response is that such compensation is not included in the Act, and that the problem reverts to MDC to devise a system for payment in lieu of taxes or other intercommunity compensation if desired. In interviews, the MDC has not rejected such potential compensation although it would appear to require new legislation. This issue is just beginning to surface: it may become significant if the satellite plants continue to remain feasible alternatives.

Reaction to the costs proposed in the 208 Basin plans has been generally slight, though it was significant in a few cases. For example, the MAPC estimated that sewering would add about $2.50 to the Acton tax rate; Acton responded with an estimate of over $12.00 (as part of its numerous comments on the plan). Other communities have also commented that the MAPC costs were very low, largely because the agency only evaluated costs for sewers of 12" diameter or larger. Again, cost appears to enter the debate as part of a general questioning of the proposed project; it is not a matter of "This is a good idea, but it costs too much," but rather "We disagree with what you proposed, on all grounds, including cost."

There is beginning to be some concern with cost-effectiveness as an important issue. For example, the Boston Harbor CAC has recently asked:

> "...what contribution to better water quality is projected from each major project?...And are there alternatives to the proposed program which meet water quality objectives, and are cost-effective and environmentally sound?..."*

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*Subcommittee Report to the Boston Harbor CAC. "Distillation of Questions Submitted by Members." September 19, 1977.

In essence, two types of public reaction to costs have been demonstrated. One, as shown in the current MDC system, is ignorance or fatalism; the costs appear relatively unchanging, and there is little to be done about them, so the public and communities do not react. The second occurs in planning, where cost is one of many concerns in attempting to find an acceptable system. Cost is just one impact, and is used as part of the negotiation process. This is shown in the reaction to the 208 basin plans, the site evaluation committee negotiations, the Boston Harbor CAC request for cost-effectiveness analysis of the individual investments, and so forth. A third type of reaction arises when residents show concern over costs, but this has generally occurred after implementation, in the study area (See Chapter 7).

6.2.2 The MDC Financing Process and the Impacts of EMMA

The MDC is a state agency, and receives its funds from the state General Fund. However, it is also a regional agency, supported by assessments on its users. The combination works as follows:

1. First, the Sewerage Division of MDC prepares a budget, along with the other divisions of the MDC.

2. This budget is reviewed by the Commissioners of the MDC, and submitted to the Executive Office of Environmental Affairs, where it receives further review before being passed to the Governor's office. After review there, it is included in the state budget, and forwarded the General Court.*

3. After deliberations and revisions, the General Court passes the state budget, and the Governor signs it (including some portion for the Sewerage Division).

4. In parallel to this effort, the MDC has prepared an allocation formula, using a method authorized by law, and held a public hearing informing communities of their relative assessment. Each member community may comment on whether its proportion of the total sewer district budget is reasonable.

5. Later in the year, the state issues a "cherry sheet" (it is printed in red paper) to each community in Massachusetts, summarizing all interjurisdictional payments and revenues (MDC, highways, welfare, education, etc.). The MSD assessment is a line item on the "cherry sheet" for member communities.

6. Communities then set their property tax rates, and rates for services such as water and sewer; they either receive a check from the state for the balance on the cherry sheet, or pay the state as required. At present, the community

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*The Massachusetts legislature. (See Appendix B).

can finance the MDC and other payments in any allowable manner.*

7. The general fund receives these payments and other state taxes, and pays the MDC according to its budget.

8. Bonds are authorized by the state budgetary process, and principal and debt service payments are included in the annual operating budget.

This system is shown in Figure 6-2. It tends to hide the sewer district costs from both user and potential users. In general, information is not provided to citizens on their tax bills about how much of the funds reach the sewer district, and many communities do not include MDC charges on their own sewer and water bills (again, local and MDC costs are aggregated). There is also little opportunity for local control over the system: community representatives can comment on their relative assessments compared to other communities, but any attempts to change service level must work through the Commonwealth's budgeting in the legislature. The MDC, a regional agency, is included in the state budget during consideration of such issues as statewide budget cuts, and other state policies; there are more representatives from the non-user districts than from the MDC members.

Since principal and debt service payments are relatively fixed from year to year, the main impact of this system is a lack of control over district operations (See Chapter 7). If users wish to have their costs reduced, they must do so by requesting it of their legislators (or the MDC). If they wish increased service at higher costs, this will result in a higher apparent state budget, and again, must be done through the General Court. If they are indifferent, the likely result is not continued operation, but major cuts in times of fiscal limits: the operating budget of the MSD was cut 17% by the legislature in fiscal 1976 and 12% in fiscal 1977 (where the submitted budget was limited by the Governor's Office to be identical to 1976).

The EMMA study addressed many of these institutional problems. The Financing and Management study reviewed the organization of several other large metropolitan sewerage service suppliers.** After analyzing six alternatives, a recommended management plan was presented as part of the EMMA study Report. The recommended plan would have modified the sewerage division while maintaining the basic MDC structure. A single commissioner would have considerably greater managerial responsibility with regard to small capital expenditures and staffing. Primary responsibility for overseeing the financial matters of the MSD would be given to a new Municipal Advisory Committee (MAC) made up of representatives from member municipal governments and local citizens. The MAC would have the power of budget review, including matters of staffing and capital expenditures. Matters agreed on by the MAC, including the annual O&M budget, could only be changed by a two-thirds vote of the legislature.

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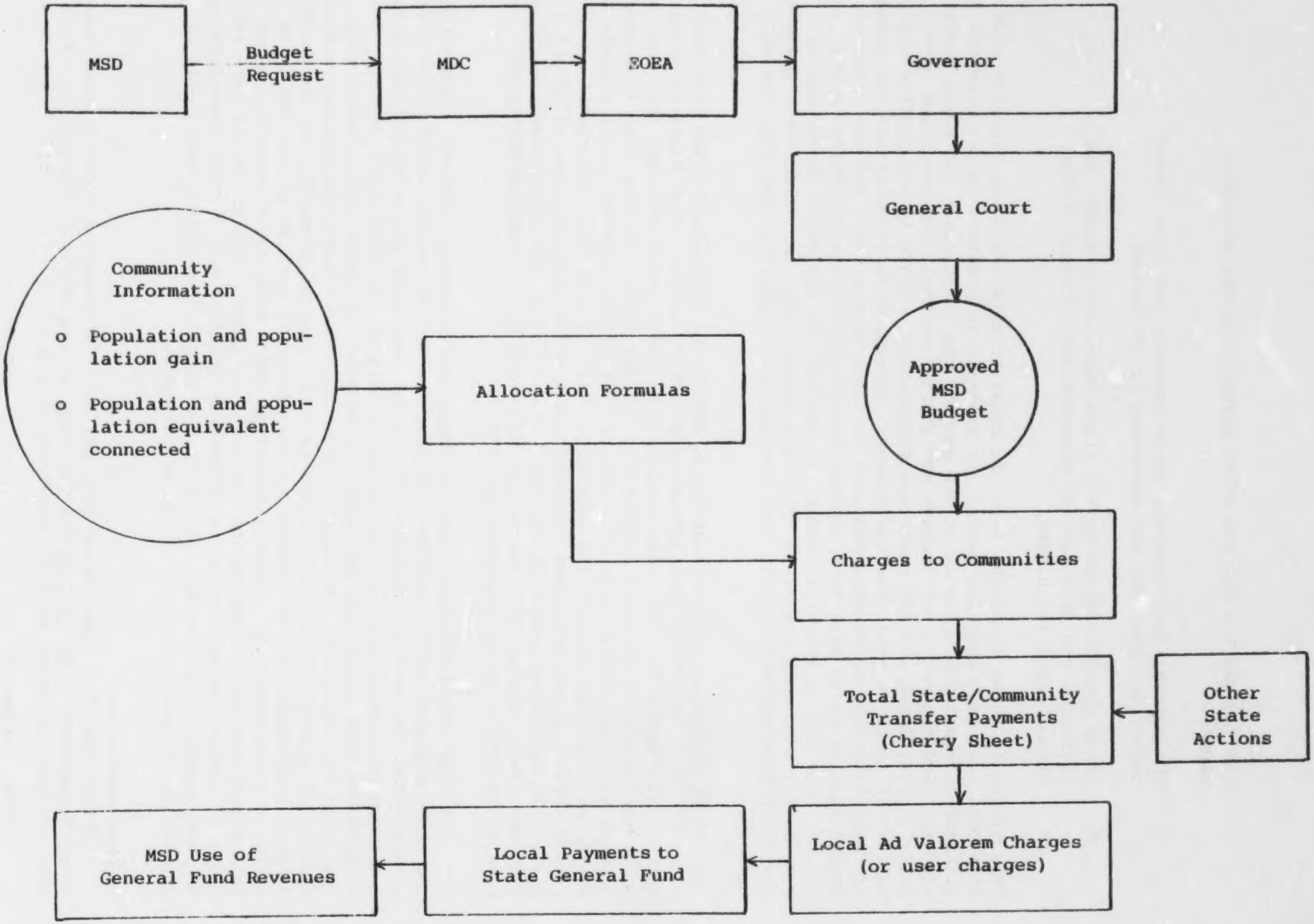
*Under the 1977 Clean Water Act, §22(a)(2), communites which finance wastewater management by ad valorem charges such as the property tax will be required to list how much is being paid for sewerage on each bill.

**EMMA, Volume 12.

Figure 6-2

CURRENT MDC FINANCING PROCEDURES


MSD
Budget Request
MDC
EOEA
Governor
General Court
Community Information
o Population and population gain
o Population and population equivalent connected
Allocation Formulas
Approved MSD Budget
Charges to Communities
Total State/Community Transfer Payments (Cherry Sheet)
Other State Actions
Local Ad Valorem Charges (or user charges)
Local Payments to State General Fund
MSD Use of General Fund Revenues

The recommended management structure from the EMMA report was not accepted by the MDC -- though some of the interviewed staff members felt self-financing to be desirable -- and no action has been taken to implement the several provisions as a whole.*

Once the total is set, it must be allocated to communities, and then to users. The MSD has recently made a transition from one allocation system to another. Originally, capital costs (principal and debt service) were paid by communities on a basis of available capacity -- essentially the cross-sectional area of all local pipes connecting to the regional system. O&M costs were allocated on a population basis, independent of industrial flow.

Over the last three years, the allocation system has been revised considerably. The theory is still the same: capital costs allocated by potential service from the area, and O&M costs by actual flow. However, population equivalents are now used, including industry in both portions of the formula.** Now, for any particular town i, the allocation ratio is:

$$\text{town } i \text{ capital costs} = \left(\frac{\text{population equivalents}_i}{\sum\limits_{\text{all towns}} \left(\text{population equivalents}_i \right)} \right)$$

$$\text{town } i \text{ O\&M Costs} = \left(\frac{\text{sewered population equivalents}_i}{\sum\limits_{\text{all towns}} \left(\text{sewered population equivalents}_i \right)} \right)$$

A district member with little current flow, such as Holbrook, pays its proportional share of capital costs, but very little of the O&M costs. A fully-sewered community, such as Boston, pays an Assessment in accordance with its flow.

The changes in assessment procedures made major differences in costs to communities yet received little comment from them, according to MDC and community officials.

Once the communities receive their assessments, they generally do not charge the users directly for MDC costs. In fact, 30 of the 43 MSD members do not bill for sewer service at all: all sewer charges are included in the property tax.***

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*There is legislation to eliminate the Assistant commissioners but that was started before EMMA was released.

**Population equivalents are the sum of population flow and industrial flow, measured as an equivalent number of people.

***Arthur Young & Company. Final Report on a Conceptual Design for User Charges and Industrial Cost Recovery Systems. Prepared for the MDC. May, 1977.

Even fewer include the MSD costs in their sewer billings. The costs of sewer service are generally hidden from the users.

Table 6-3 shows the effect of the MDC allocation system on the expected charges to communities and households, under the proposed EMMA construction schedule. These costs are given for 1985 and 2000, both in constant 1975 dollars, and in current dollars assuming 4% inflation over the period of interest. These costs are not extreme -- $100/household annual local costs (or 1% of median income) appears acceptable, according to EPA guidance. However, current costs/household are about @1 annually in 1975 $ ($23.99 in current $ as of 6/30/77), so that the increase is large. In addition, the costs are not equally distributed; households in communities which are not fully served pay more than households in communities which are sewered (assuming that the sewered households pay the community MDC costs; otherwise, the partially sewered communities pay somewhat lower costs per household, for less service). Under this allocation system, the communities with the lowest per household charges are the center city communities, which also have the lowest incomes. For example, 8 out of the 14 fully-sewered communities in 1975 are also in the lowest quartile of the income distribution over the towns in the MSD. Thus, the allocation system shows a tendency to redistribute income slightly, from high-income to low-income areas.

Proposed UC/ICR Systems

According to Chapter 92 of the Massachusetts General Laws, and based on PL 92-500, MSD member communities are required to develop acceptable User Charge and Industrial Cost Recovery systems. Twenty-five of the forty-three MSD members also plan to become recipients of grants under PL 92-500 , which would require local communities to implement user charges and industrial cost recovery on their own even in the absence of new MDC facilities. Almost all water consumption is metered within the MSD member communities, and this could be the basis for the charge.

The Arthur Young report *, recently prepared for the MDC, suggests a design for community-based UC/ICR systems. It proposed a decentralized approach, where the communities would basically be responsible for billing each sewer user, and for providing the MDC with information on flow, population equivalents, or other bases for the allocation of MDC costs. Both MDC user charges and ICR would be allocated to communities for local billing, with MDC providing technical support in billing procedures, setting the user classes and standards for them, and monitoring industrial users. There has been some comment from industry on the ICR issue, primarily statements that ICR should not apply to combined sewer overflow and infiltration/inflow investments. In other words, the industries feel that ICR should be based on the industrial portions of the waste, and not on correcting problems in the existing system downstream from them. The MDC has felt that implementation of ICR will be difficult, particularly in defining major industries.

However, this is discussed in Section 24 of the 1977 Clean Water Act, and appears to be resolved at a level of 25,000 gallons per day, which should not be a major problem: industries with lower flows need not be considered in ICR.

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*Arthur Young & Company, op. cit.

Table 6-3

ANNUAL COSTS OF MDC SERVICES TO MEMBER COMMUNITIES UNDER THE EMMA PLAN

($/Household)

	Costs in 1985		Costs in 2000	
Community	(1975 $)	(Current $)	(1975 $)	(Current $)
Arlington	47.30	70.02	34.07	90.83
Ashland	63.75	94.37	36.34	96.88
Bedford	54.24	80.29	35.59	94.88
Belmont	48.36	71.58	34.27	91.36
Boston	47.30	70.02	34.07	90.83
Braintree	47.46	70.25	34.07	90.83
Brookline	47.30	70.02	34.07	90.83
Burlington	52.65	77.93	34.79	92.74
Cambridge	47.30	70.02	34.07	90.83
Canton	52.53	77.76	35.12	93.62
Chelsea	47.30	70.02	34.07	90.83
Dedham	48.36	71.58	34.27	91.36
Everett	47.30	70.02	34.07	90.83
Framingham	48.83	72.28	34.41	91.73
Hingham	65.20	96.51	38.38	102.31
Holbrook	70.66	104.59	36.58	97.52
Lexington	49.70	73.57	35.04	93.41
Malden	47.30	70.02	34.07	90.83
Medford	47.38	70.13	34.07	90.83
Melrose	47.30	70.02	34.07	90.83
Milton	47.72	70.64	34.07	90.83
Natick	50.55	74.83	35.21	93.86
Needham	48.46	71.73	34.27	91.36
Newton	47.30	70.02	34.07	90.83
Norwood	47.38	70.13	34.07	90.83
Quincy	47.30	70.02	34.07	90.83
Randolph	52.59	77.85	34.95	93.17
Reading	51.32	75.97	34.56	92.13
Revere	47.72	70.64	34.07	90.83
Somerville	47.30	70.02	34.07	90.83
Stoneham	47.55	70.39	34.07	90.83
Stoughton	56.36	84.43	35.79	95.41
Wakefield	47.98	71.02	34.07	90.83
Walpole	55.57	82.26	36.11	96.26
Waltham	48.87	72.34	34.27	91.36
Watertown	47.30	70.02	34.07	90.83
Wellesley	51.58	76.35	34.95	93.17
Westwood	53.41	79.06	35.04	93.41
Weymouth	51.58	76.35	34.95	93.17
Wilmington	63.75	94.37	36.71	97.86
Winchester	47.30	70.02	34.07	90.83
Winthrop	47.30	70.02	34.07	90.83
Woburn	48.94	72.94	34.41	91.73
Mean	48.29	71.48	34.34	91.54

SOURCE: USR&E analysis of MDC construction schedule.

Approximately 8.5% of the current MDC flow is contributions from major industries, defined by the district as those discharging over 50,000 gallons per day. In our cost analysis, however, we have used the MAPC estimates for employment in "dry", "wet", and "very wet" industries in the study region for 1985, which includes more industries, and therefore shows higher industrial flows. However, this should have no effect on ICR, which is a charge per gallon based on industry contribution to capital costs. We have assumed that ICR would be assessed annually, would apply to both the state and federal shares, and would be based on the formula

$$\text{ICR (\$/1,000 gallons)} = \text{Flow (1,000 gallons)} \times \frac{\text{Principal Payment (\$)}}{\text{1-Fed share-State share}}$$

The results of applying this formula are shown in Table 6-4. In the peak year under this allocation, ICR charges amount to about 10¢/thousand gallons, or an increase of about 15% over the user charge costs on average. In later years, the ICR cost drops even further; Federal ICR cost is 83% of this charge, or 8.3¢/1,000 gallons in 1985. This does not appear to be a significant burden on industry.

Table 6-4

IMPACTS OF INDUSTRIAL COST RECOVERY

	User Charge & Local Capital ¢/1,000 gallons (1975 $)	ICR Charge (¢/1,000 gallons)	Total Cost to Industry (¢/1,000 gallons)
1985	63.64	10.04	73.68
2000	45.25*	7.14	52.39

Magnitude of Costs and Sources of Funds

The projected EMMA program is expected to cost at least $885 million in constant 1975 dollars, with 75% of that cost financed from Federal funds. Massachusetts currently receives about $140 million per year in current dollars under the construction grants program, and this amount is not expected to rise significantly. Most of the expenditures under EMMA are expected to occur before 1985, primarily in the 1981 to 1985 period. In essence, then, EMMA is expected to require the full grant amounts for Massachusetts for almost five years. Table 6-5 presents the capital expenditures expected annually, in constant and current dollars.

This is not yet a major local or state issue. It would reasonably be expected that communities in the rest of the Commonwealth would be concerned that all grant funds were going to the Boston area, but they have been receiving the grants up to now, and their needs are decreasing. The Division of Water Pollution Control reported to us that most of the expected treatment plant projects have been funded, for example, and that the major remaining plants are primarily coastal ones requiring upgrading. They expect to be able to fund these systems before the EMMA plan implementation actually occurs. Thus, the remaining needs for the balance of the State will be significantly lower priority than the EMMA projects when the latter are ready for implementation.

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*Capital costs drop because of financing method, which uses constant principal payment bonds.

Table 6-5

MAGNITUDE OF CAPITAL COSTS FOR EMMA

Year	Project Numbers**	Capital ($1000, 1975)	Capital* ($1000, Current)	Projected Grant (75% of Current $)	State Allocation ($1000)
1978	2,4	1999	2249	1686	132939
1979	1	25573	29917	22438	147710
1980	3	77000	93682	70262	147710
1981	14,16,17,18,19	26305	33284	24963	147710
1982	5,6,10-13,20-22	307072	404086	303064	147710
1983	7,8,9,23,24,25	268324	367219	275415	147710
1984	15,26,27	86493	123107	92330	147710
1985	28,29,30,31	8537	12637	9477	147710
1986	34	2670	4110	3083	?
1987	32	203	325	244	?
1988	33,35	5338	8888	6666	?
1989	36	8428	14595	10945	?
1990	37	1012	1823	1367	?
1991	38,40	1257	2354	1766	?
1992	39,41	7872	15334	11500	?
1993	42	3832	7763	5822	?
1994	43,44	3639	7667	5750	?
1995	45,47	1302	2853	2140	?
1996	48,50	2527	5758	4319	?
1997	46,49	7718	18291	13718	?
1998	51	2911	7175	5381	?
1999	52	4250	10894	8171	?
Total	--	854262	1174011	880508(799635 to 1985)	

*Assuming 4% inflation from 1975, to be conservative

**From EMMA schedule, assuming capital is required at the midpoint of construction.

There is no difficulty expected in receiving bond authorization for the MDC costs of the program.* Thus, the Federal and local funds are expected to be available for EMMA implementation.

6.2.3 Effects of Cost-Effectiveness Assumptions

The assumptions made about financial allocation can have a significant impact on the estimated costs, and potentially on public reaction. As a simple example, all cost-estimates are made in constant dollars under EPA procedure; it appears, as discussed in chapter 7, that estimates of the current dollar costs of O&M have been fairly accurate, yet threefold increases in the current dollar O&M costs over the past few years have had a significant effect on user charges.

EPA makes a set of assumptions in designing its cost-effectiveness analysis, including:

- a 20-year planning horizon, with salvage value at the end of that period;
- specific lifetimes for particular items, ranging from 20 to 50 years;
- constant dollars, with inflation allowed up to the proposed date of operation;
- a discount or interest rate as set by the Water Resources Council, though 7% also seems to be used;
- distribution of charges according to fractional flow;
- capacity set at 20 years projected growth for sewers, and 10 years for treatment plants (this policy is not yet implemented, but expected).

20 Year Planning Horizon, With Salvage of Capital

For simple projects, which start at the beginning of year 1 and operate to year 20, and which are roughly similar in their characteristics (e.g., two treatment plants), this approach will be satisfactory. Consider, however, the situation with EMMA, where a project may not start until 1999 and be salvaged in 2000. O&M for this project is considered to a lesser degree than for its identical brother, which was built in 1990. To be accurate, EPA should include not only the salvage value of capital at the end of the 20 years, but also the salvage cost of the future O&M stream. Otherwise, the Net Present Value calculations will be biased in favor of projects with high O&M costs, since those costs are simply lost after 20 years. This bias is equally important when comparing projects which differ in O&M costs, even if they start at year 1: only the first 20 years of O&M costs enter the analysis under EPA's rules. However, the effect is relatively small if all projects start at year 1: at a discount rate of 7%, an infinite stream of $1 payments starting at year 20 only has a present value of $3.69 at year 0.

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*Metcalf & Eddy Report on Management of EMMA; and EMMA Volume 14.

There is a simple remedy to this problem, which would reduce the analysis required in the full cost-effectiveness and eliminate problems in defining salvage value: instead of planning for 20 years with salvage, simply assume that the system is being built to last, and that replacements will be built when required. In that case, each investment is an annuity -- you build a treatment plant now, and operate it for 20 years; then you build its replacement and operate that for 20 years, and so forth (under current dollars). For each investment, the present value is

$$\text{Total NPV} = \text{NPV (1 cycle)} / (1 + (1 + i)^{-N})$$

where N is the length in years of the cycle and i is the discount rate. We did not perform any explicit analysis of the effects of O&M costs beyond the planning horizon, since we were not attempting to develop estimates of the Net Present Value for the complete EMMA plan.

Design Lifetimes for Particular Items

Aside from the problems of defining amortization schedules for items which last longer than the planning horizon, there are no major problems with these assumptions.

Constant Dollar Analysis

Principal and debt service payments are characteristically different from operations and maintenance, as any homeowner with a low mortgage knows. During inflation, the constant dollar cost of bond payments drops. It is simpler to see in current dollars: assume a constant payment bond at $1,000/year, and O&M costs which are constant at $1,000/year in real dollars, but rise at 7%/year in current dollars. In the first year, O&M and capital payment are equal at $1,000 each. In year 10, however, the capital payment is still $1,000, while the O&M has risen to $2,000. In year 20, capital remains $1,000, while O&M is up to $4,000. Figure 6-6a shows this pattern, and the corresponding pattern of constant dollar costs. EPA's guidelines understate the cost of O&M relative to capital by assuming that they are both affected equally by inflation.

Note that we are not even including the effect of inflation in wastewater management relative to the rest of the economy. While this has occurred since 1973*, and may continue, it only makes the situation worse: in Figure 6-6b, instead of remaining constant, O&M costs would rise over time, while capital would continue to fall. Binkley has estimated the long-term relative rate of

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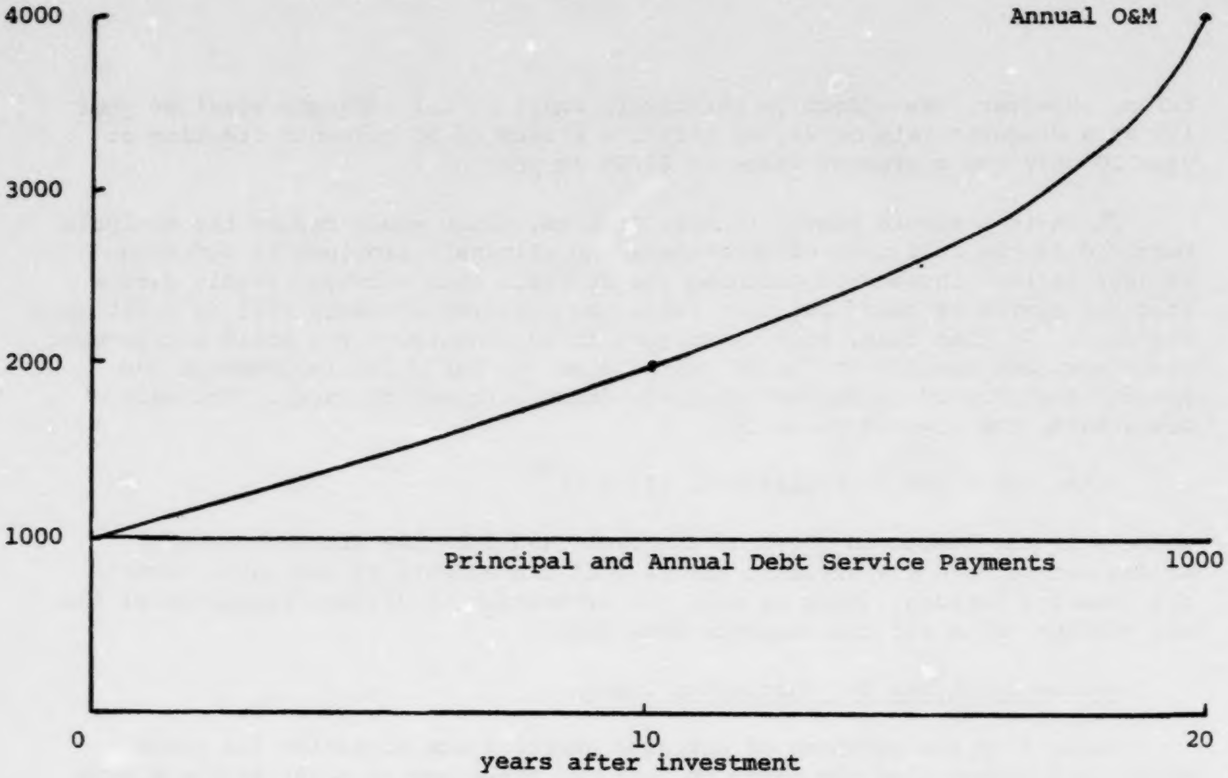
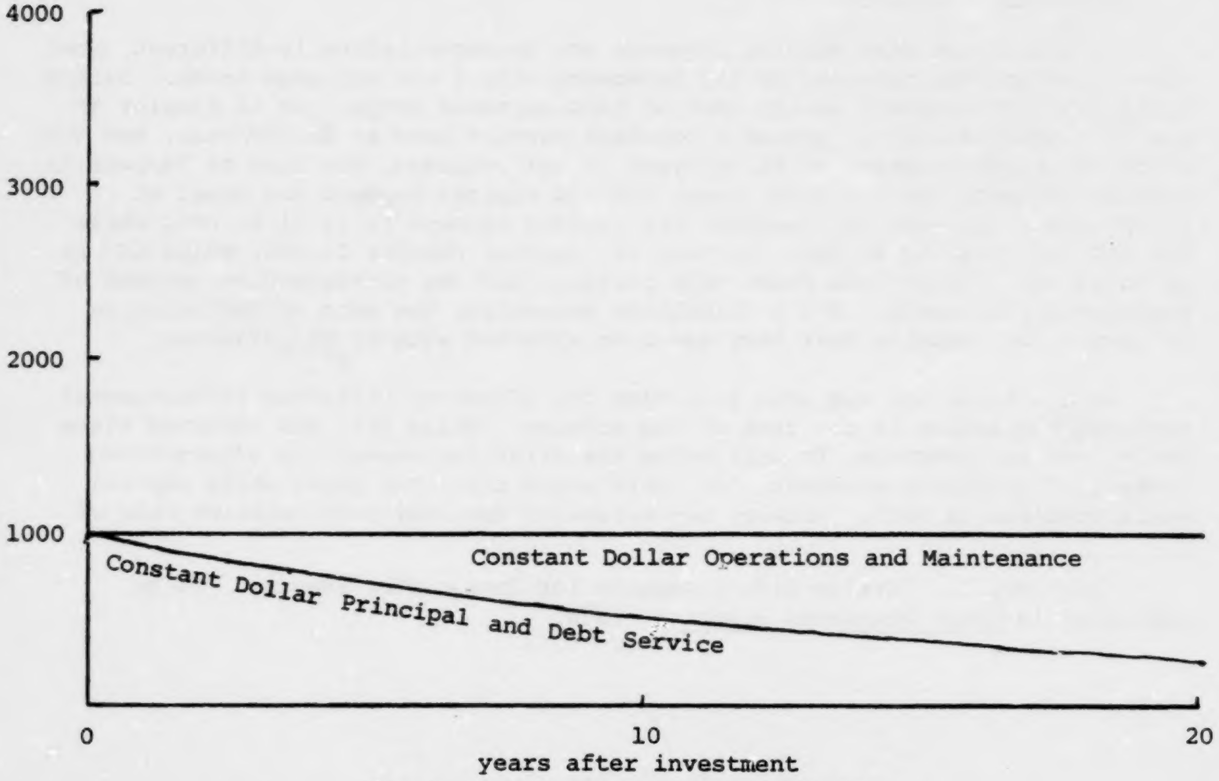
*Binkley, C. "Design Life Standards for Interceptor Sewers." To be published in Water Resources Research, 1978.

Figure 6-6

EFFECTS OF INFLATION



Current Dollar Costs @ 7% Inflation



Constant Dollar Costs @ 7% Inflation

inflation for interceptor sewer construction at 1.8%, and Table 6-7 shows the effect of applying this relative inflation rate to the expected system costs. We have assumed that the 1.8% relative inflation applies to capital costs up to the date of financing (assumed as the midpoint of construction) and to O&M costs for the life of the project.

As might be expected, relative inflation has little effect in the early years, but an increasing impact later on. For example, without relative inflation, the constant dollar costs dropped by about $14 from 1985 to 2000, because of decreased debt service payments; with relative inflation, the drop was only $6 over the period. Relative inflation can be expected to keep costs high over time, because of a continuing increase in operations and maintenance expenses.

Choice of Discount Rate

There is another way to look at this problem, which probably forms the easiest solution. The current dollar interest rate (or discount rate) is the sum of the constant dollar rate and the rate of inflation.* However, if we are working in constant dollars, we should use the constant dollar rate for our present value calculations. EPA requires a rate about the same as the current dollar municipal bond rates (near 7%), while the long-term, constant dollar rate is about 3%.**

Table 6-7

EFFECTS OF RELATIVE INFLATION ON COSTS

	Constant 1975 $/Household without Relative Inflation	Constant 1975 $/Household with Relative Inflation	Current* $/Household without Relative Inflation	Current* $/Household with Relative Inflation
1985	48.29	56.18	71.48	83.16
2000	34.34	50.49	91.54	134.60

*General Inflation of 4%; cross term not considered.

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*Plus a cross-product term: see Hanke, S.H., P.H. Carver, and P. Bugg. "Project Evaluation During Inflation" in Water Resources Research. 11(4):511-514. Aug., 1975.

**See, for example, the review by Klemperer, W.D. "Economic Analysis Applied to Forestry," J. of Forestry. 74:609-611, 1976, which reports the following long-term increases

o long-term corporate bonds	2-3% (real)
o diversified common stock (1870-1970)	6% (pretax and nominal)
o land value of farms (1850 to present)	2½% (real)

Table 6-8 shows the effect of using a 7% discount rate with a constant dollar analysis, compared to the 3% rate used in the previous analyses. Since 90% of the capital costs for the new investments is paid by the Federal government and the Commonwealth, the effects of the difference in rates on MDC members is not severe. However, the table also shows the total cost of serving each household (including funds supplied by state and federal grants) for the period in question; here, the difference in costs is considerably greater. The choice of discount rate is more significant for EPA in its cost-effectiveness analyses than it is for the communities in their payments.

Table 6-8

EFFECTS OF VARYING DISCOUNT RATES
(constant 1975 $)

	Local $/Household		Total $/Household	
	3%	7%	3%	7%
1985	48.29	51.16	86.30	113.70
2000	34.34	35.37	68.18	78.52

Distribution of Charges According to Flow

Distributing charges according to flow seems like a reasonable action, given the mandates of P.L. 92-500. If the allocation is distributed by flow, then all households will be charged equally for the MDC system costs. This can be significant: for example, the 1985 costs in Table 6-3 range from $47.30 to $70.66 per household with a mean of $48.29. A large number of households and industries pay the minimum, in areas such as Boston, Cambridge, and Somerville; relatively small and unsewered communities on the periphery face high charges, such as Holbrook, Ashland, Hingham, and Wilmington. While these communities are projected to grow faster than the remainder of the system, the major impact of the allocation formula is to greatly increase their costs, and probably to decrease the probability that new members will join the MDC. This is clearly the case in Weston, and may be occurring in the other seven new members suggested in EMMA.

6.2.4 Local Costs

The MDC is not expected to be the only recipient of Construction Grants funds in the area. In fact, 25 of the 43 MDC member communities are expected to obtain grants for portions of their own sewer systems according to the 1975 Needs Survey and other data. Needs Survey cost estimates have been used to include these costs in the town burdens, under the following assumptions:

- o Costs in categories I-IVB (treatment plants, interceptors, and sewers) were assumed eligible for 75% Federal and 15% state grants.
- o Construction was assumed to be distributed over time, with 4% each year for the 1975 to 2000 period. This was done since no data on expected implementation dates were available.

- Operations and maintenance expenditures were assumed to be set at 2% of the cost of plant and equipment in place for each year, which is typical for sewers, and probably an underestimate for treatment plants.*

The results for 1985 and 2000 are shown in Table 6-9. The direct local system costs range from extremely small amounts per household (e.g., Boston's 18¢ in 1985) to large expenditures for construction of sewers and other investments, such as Stoughton's $47.26 in 2000. There is every reason to believe that these are underestimates, for the following reasons:**

- Current local debt service and operations and maintenance were not included, though they will continue.
- Needs appear to be more extensive than estimated by EPA, as simply demonstrated by the fact that Medford, Revere, and Winchester all have received Step 1 funds, although the 1976 Needs survey showed no needs for these communities.
- Construction will probably occur over the next ten years, rather than over the next 25, given the current rate of facilities planning.
- Some of the costs (e.g., collector sewers in Holbrook) will probably not be grant eligible; others, such as house connections, are not included at all.

Therefore, it is very likely that a few of these MDC member communities will face local costs which approach $100/year for every household, in constant 1975 dollars, even ignoring relative inflation and the other factors mentioned previously. In current dollars, the costs are much higher, as shown in Table 6-10.

Table 6-11 shows the effects of these costs, using some measures of community welfare for comparison. In the table, the costs from Table 6-9 for 1985 are shown as they relate to the 1975 median income for the community,***to current taxes,**** and to water use. Costs range from 0.28% of median income in Winchester to 0.74% in Stoughton. Tax rates will rise from a minimum of 2% in Wellesley to 8% in Walpole. For the MDC costs alone, the range of income effects if from 0.27% to 0.63%, with tax rate increments from 1.7% to 6.8%. The costs for the lowest income communities are among the lowest overall, with the inner city communities and older suburbs paying somewhat lower costs than the outer suburbs and growth areas.

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*See E. Lake, et. al. Distribution of Water Pollution Control Costs. Prepared by USR&E for the National Commission on Water Quality, 1975.

**These underestimations could be balanced by savings resulting from the implementation of innovative and alternative systems as encouraged by P.L. 95-217. As these are often "small-scale solutions," total project costs for meeting water quality goals could be substantially less.

***1970 median income scaled up by the national ratio of median income 1975 to median income 1970.

****Taxes were equalized to 100% valuation, with 1975 rates used as the base.

Table 6-9

IMPACT OF LOCAL CONSTRUCTION EXPENDITURES

(Constant 1975 $)

	$/Household in 1985			$/Household in 2000		
Town	MDC Costs	Local System Costs	Total	MDC Costs	Local System Costs	Total
Arlington	47.30	0.00	47.30	34.07	0.00	34.07
Ashland	63.75	0.00	63.75	36.34	0.00	36.34
Bedford	54.24	20.48	74.72	35.59	32.94	68.53
Belmont	48.36	0.00	48.36	34.27	0.00	34.27
Boston	47.30	0.18	47.48	34.07	0.47	34.54
Braintree	47.46	0.07	47.53	34.07	0.15	34.22
Brookline	47.30	0.00	47.30	34.07	0.00	34.07
Burlington	52.65	0.00	52.65	34.79	0.00	34.79
Cambridge	47.30	0.00	47.30	34.07	0.00	34.07
Canton	52.53	8.37	60.90	35.12	13.45	48.57
Chelsea	47.30	0.00	47.30	34.07	0.00	34.07
Dedham	48.36	2.99	51.35	34.27	6.67	40.94
Everett	47.30	0.16	47.46	34.07	0.45	34.52
Framington	48.83	0.60	49.43	34.41	1.35	35.76
Hingham	65.20	15.93	81.13	38.38	21.19	59.57
Holbrook	70.66	22.97	93.63	36.85	18.39	54.97
Lexington	49.70	0.49	50.19	35.04	1.04	36.08
Malden	47.30	2.19	49.49	34.07	5.56	39.63
Medford	47.38	0.00	47.38	34.07	0.00	34.07
Melrose	47.30	1.10	48.40	34.07	2.56	36.63
Milton	47.72	1.99	49.71	34.07	3.46	38.55
Natick	50.55	0.00	50.55	35.21	0.00	35.21
Needham	48.46	0.10	48.54	34.27	0.19	34.46
Newton	47.30	0.29	47.59	34.07	0.71	34.88
Norwood	47.38	0.15	47.53	34.07	0.33	34.40
Quincy	47.30	0.37	47.67	34.07	0.78	34.85
Randolph	52.59	8.13	60.72	34.95	3.48	48.43
Reading	51.32	1.38	53.70	34.56	4.15	38.71
Revere	47.72	0.00	47.72	34.07	0.00	34.07
Somerville	47.30	0.00	47.30	34.07	0.00	34.07
Stoneham	47.55	.32	47.87	34.07	.63	34.70
Stoughton	56.36	30.34	86.70	35.79	47.26	83.05
Wakefield	47.98	1.18	49.16	34.07	2.71	36.78
Walpole	55.57	11.43	67.00	36.11	18.15	54.26
Waltham	48.87	3.43	52.30	34.27	8.47	42.74
Watertown	47.30	0.00	47.30	34.07	0.00	34.07
Wellesley	51.58	8.62	60.20	34.95	17.35	51.60
Westwood	53.41	12.91	66.32	35.04	14.57	49.61
Weymoutn	51.58	1.62	53.30	34.95	3.20	38.15
Wilmington	63.75	4.18	67.93	36.71	5.94	42.65
Winchester	47.30	0.00	47.30	34.07	0.00	34.07
Winthrop	47.30	0.00	47.30	34.07	0.00	34.07
Woburn	48.94	0.00	48.94	34.41	0.00	34.41

SOURCE: USR&E analysis of MDC and Needs Survey data.

TABLE 6-10

LOCAL COST IN CURRENT DOLLARS

(Assuming 4% inflation)

	$/household			$/household	
TOWN	1985	2000	TOWN	1985	2000
Arlington	70.02	90.83	Needham	71.85	91.86
Ashland	94.37	96.88	Newton	70.44	92.98
Bedford	110.60	182.69	Norwood	70.36	91.70
Belmont	71.58	91.36	Quincy	70.56	92.90
Boston	70.28	92.08	Randolph	89.88	129.11
Braintree	70.36	91.22	Reading	79.49	103.19
Brookline	70.02	90.83	Revere	70.64	90.83
Burlington	77.93	92.74	Somerville	70.02	90.83
Cambridge	70.02	90.83	Stoneham	70.86	92.50
Canton	90.15	129.48	Stoughton	128.34	221.40
Chelsea	70.02	90.83	Wakefield	72.77	98.05
Dedham	76.01	109.14	Walpole	99.18	144.65
Everett	70.25	90.02	Waltham	77.42	113.94
Framingham	73.17	95.33	Watertown	70.02	90.83
Hingham	120.09	158.80	Wellesley	89.11	137.56
Holbrook	138.60	146.54	Westwood	98.17	132.25
Lexington	74.29	96.18	Weymouth	78.90	101.70
Malden	73.26	105.65	Wilmington	100.55	113.70
Medford	70.13	90.83	Winchester	70.02	90.83
Melrose	129.03	97.65	Winthrop	70.02	90.83
Milton	73.58	102.77	Woburn	72.44	91.73
Natick	74.83	93.86			

Table 6-11

IMPACT OF COSTS ON COMMUNITIES, 1985

Town	% of Median Income	Tax Millage*	% Property Tax Increase	¢/Thousand Gallons
Arlington	0.39	1.60	3.39	62.33
Ashland	0.52	0.47	4.58	84.02
Bedford	0.52	2.90	7.24	98.47
Belmont	0.36	1.15	2.99	63.73
Boston	0.52	5.63	4.15	62.57
Braintree	0.36	1.88	5.07	62.64
Brookline	0.35	1.45	2.70	62.33
Burlington	0.40	1.26	3.10	69.38
Cambridge	0.48	3.65	5.21	62.33
Canton	0.44	2.63	6.76	80.26
Chelsea	0.53	5.03	4.94	62.33
Dedham	0.42	1.73	5.06	67.68
Everett	0.47	1.72	4.31	62.55
Framingham	0.38	2.39	6.18	65.14
Hingham	0.57	1.11	2.67	106.92
Holbrook	0.83	1.56	3.83	123.38
Lexington	0.29	1.20	2.97	66.14
Malden	0.48	3.05	5.50	65.22
Medford	0.43	2.28	4.67	62.44
Melrose	0.39	2.21	5.01	63.78
Milton	0.34	1.42	3.80	65.51
Natick	0.38	1.73	4.66	66.62
Needham	0.30	1.34	3.93	63.97
Newton	0.31	1.66	3.17	62.72
Norwood	0.38	2.56	6.86	62.63
Quincy	0.43	2.82	5.61	62.83
Randolph	0.49	2.12	4.66	80.02
Reading	0.40	1.64	4.02	70.77
Revere	0.46	1.96	3.54	62.88
Somerville	0.49	3.43	5.73	62.33
Stoneham	0.39	2.02	4.84	63.09
Stoughton	0.74	2.58	6.24	114.25
Wakefield	0.40	2.25	5.44	64.79
Walpole	0.52	3.53	8.29	88.30
Waltham	0.45	2.55	6.28	68.93
Watertown	0.41	2.42	4.23	62.33
Wellesley	0.31	0.77	2.01	79.34
Westwood	0.38	1.23	3.03	87.40
Weymouth	0.46	1.49	3.31	70.24
Wilmington	0.58	1.43	3.55	89.52
Winchester	0.28	1.46	3.06	62.33
Winthrop	0.40	2.12	4.82	62.33
Woburn	0.42	2.11	5.38	64.49

*$/1000 at 100% valuation.

SOURCE: USR&E analysis.

6.3 CONCLUSIONS AND RECOMMENDATIONS

The impact assessment process is a significant step in planning, and can have a major impact on the alternative which is finally chosen for design. Federal guidelines and standards appear to be met in the current process, whether they are for presentation of costs, materials to be contained in the EIS, requirements that projects meet the relevant water quality standards, or inclusion of public participation. There are three major conclusions, though, which must be drawn from the ways the impact assessments are performed and used:

The quality of the analysis in the EISs and cost-effectiveness reviews is not high, even when national guidelines are followed.

This was most apparent in the section on cost-effectiveness analysis, where a number of problems in the current EPA Cost-Effectiveness Analysis Guidelines were discussed. It is also true in the case of the environmental reviews, but the Proposed NEPA Regulations developed by CEQ may well present a remedy by requiring more analysis of the most significant impacts and alternatives, while reducing the amount of irrelevant material. If the impact assessment process is a major step in deciding which alterantive to choose, as it has been, then the quality of the analysis should be high, and the public and decisionmakers should be presented with an accurate (or, at least, unbiased) view of the expected costs and environmental impacts. Accuracy could be significantly improved by some fairly small changes in the Cost-Effectiveness Analysis Guidelines, and perhaps by approval of the CEQ Regulations in EIS preparation.

Public participation has been effective on localized, but not on areawide issues.

The public participation program on the Treatment Plants EIS has been described as one of the major public participation successes in the area by a number of the people interviewed. Public participation has had an effect on site location for three of the plants (Neponset, Charles, and Quincy), and may lead to shifts from the proposed EMMA plan, or to mitigating measures such as payments in lieu of taxes. However, the areawide issues of system cost, of water conservation or supply considerations, and of careful planning of sewer extensions etc., have not been voiced strongly in the impact assessment steps. In particular, cost has not been an issue either in the current MDC work or in EMMA, except in a few communities like Weston, which are faced with the question of whether they should join the MSD. The desire of the Boston Harbor CAC for consideration of costs and benefits of the individual investments is receiving as little analysis in the EIS as it has throughout the planning process, as far as can be determined in advance of EIS publication. Only in the Sludge EIS has public concern led to a significant change, through the inclusion of co-incineration as an alternative This was a major result; however, the public in this case was led by a number of state agencies, so it is difficult to call this effective public participation.

In essence, public participation in the EIS process and in the presentation of costs seems to follow the rule that local issues get attention, while regional ones do not. This appears to be true for the economics, where concern with MDC costs is slight, while costs for the systems in individual towns get more attention. It appears to be true for the EIS process, where the major effort has been directed at treatment plant location, with relatively little concern for the larger issues.

System costs do not appear to be extreme, using EPA's measures. However, costs will at least double.

Since there have been no comprehensive system cost estimates prepared in the Boston area to date, this report was charged with preparing such estimates in its scope of work. Using EPA's current rule of thumb that annual wastewater costs should be less than 1% of pretax household median income, it appears that the costs of the local program will not be extreme. However, we do project a doubling of costs in constant dollars from about $21/yr to over $47, and even greater increases in member communities who are undertaking wastewater construction programs of their own. By 1985, a few communities such as Holbrook will be approaching the 1% figure, and others will face significant charges.

The effects of Industrial Cost Recovery appear to be small, amounting to about a 15% increase in sewer charges for major industries, compared to the amounts paid by households.

EPA RegionI uses the EIS process as a lever to control which alternative is chosen.

The EIS on treatment plants has been stated in intervieews to be, in reality, facility planning; which will define the options available to the MDC in step 1. The Sludge Management EIS has considered a number of alternatives not considered in the step 1 planning, and modified the pre-existing ones significantly. EPA uses the EIS process to define what is, in its view, the most cost-effective and environmentally sound alternative, and apparently will require that that alternative be the one implemented by the local agency.

In this situation, the program is a Federal one, which the local agency may be forced to implement. At the very least, the EIS is a major tool in EPA's negotiating position; it may provide direct control over the MDC's choices. This is not necessarily bad: EPA officials view it as a necessary step in the implementation of an acceptable alternative. The MDC has responsibility for the system, but the EPA appears to have the power to define what the systems will be.

This situation is not directly comparable to the cases described in Chapter 5, and can not be remedied by simply modifying the choice process and grants procedures. In the EIS evaluations, the concern is environmental impacts, and EPA and the MDC both have the responsibility to build an environmentally sound alternative. If the two agencies cannot agree, EPA must determine which options are environmentally sound, so that the cost-effectiveness analysis can be performed.

In both the Sludge and Treatment Plant Environmental Impact Statements, the direct cause for the disagreements has been the planning sequence: in the sludge case, the MDC prepared its plan, largely independent of EPA; EPA then prepared its EIS, largely independent of the MDC. With the Treatment Plants EIS, the MDC first prepared EMMA; this is being followed by the EIS, which is modifying EMMA; and the EIS will be followed by the step 1 plan which, according to EPA, will analyze the alternative recommended in the EIS.* The agencies appear, from the interviews and their statements, to be firm in their positions, and unable to negotiate and compromise; officials in each claim to believe that the other is attempting to unreasonably control the planning process. It appears that this will continue, as long as responsibility shifts back and forth between them, through the various stages of the process.

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*See comments prepared by EPA, Region I (Daniel O'Brien) in Appendix E for further elaboration.

Therefore, we recommend increased use of the piggybacking approach, wherever possible. The current approach seems likely to require a few years for the Treatment Plants EIS, followed by a few years of facilities planning, followed probably by court action (at least, several officials have speculated that this will be the pattenr). At the very worst, concurrent EIS preparation and facilities planning would get the case to the courts earlier; it might lead to resolution of some of the disagreements, and successful planning by the two agencies working together.

The Treatment Plant EIS ignores major alternatives

The EIS on the Proposed MDC Treatment Plant improvements assumes that the major issues are related to planning of facilities, and particularly facility location. Major treatment alternatives, such as ocean discharge and land application, are not included in any depth. This would be reasonable if the EIS was, in actuality, only a part of the facilities planning. However, the EIS is required under NEPA to evaluate the environmental impacts of all major alternative actions, and these should include, at the minimum, all alternatives evaluated in EMMA.

CHAPTER 7

OPERATIONS AND MAINTENANCE

The Construction Grants Program has been stated to be a "catch-up" program, intended to aid municipalities in building the necessary facilities to meet their required effluent standards. It has generally been assumed that operations and maintenance would follow, once the plants were constructed, and that Federal and state enforcement would be sufficient to handle occasional deficiencies. Up to the present, the major goal of enforcement has been to ensure that the necessary facilities get built, and there has been less concern with the operations of these facilities.

Figure 7-1 shows the actual process for monitoring and assistance, and the division of performance among EPA, DWPC, and the local POTWs. In the figure, the major compliance role is undertaken through the monthly self-monitoring reports received by the EPA Permits Compliance Section and the DWPC Regional Office. Inspection reports by DWPC may also be useful through their observation of the physical characteristics of plant operations. Technical assistance is provided by DWPC through monthly inspections from its regional offices, and by EPA through the Municipal Facilities Operations and Maintenance Section. Coordination among these functions is complex, and may be non-existent in cases. For example, the use of the monthly monitoring reports as a guide to Technical Assistance needs is minimal: Inspections of plant operations determine where help is needed, and effluent quality data are generally ignored, because of mistrust of the self-monitoring data and other reasons.

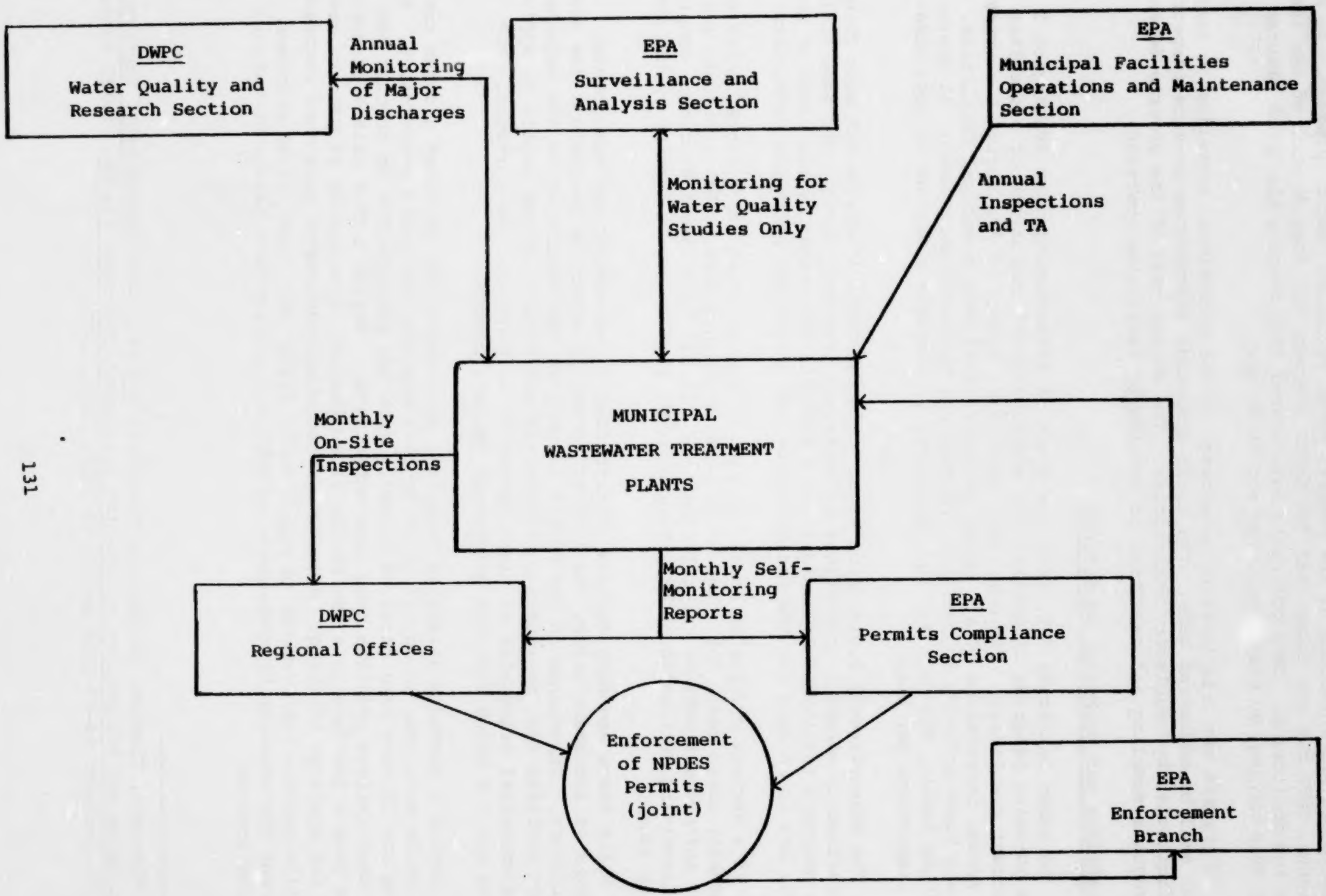
Section 7.1 of this chapter looks at EPA's role in plant operations in the study area, while Section 7.2 presents the reaction of communities to O&M expenditures. Section 7.3 then addresses the problem of continued system maintenance, and Section 7.4 presents our conclusions and recommendations with respect to O&M.

7.1 THE ROLE OF EPA AND THE COMMONWEALTH IN PLANT OPERATIONS

An essential part of the NPDES program for both municipal and industrial dischargers is a surveillance system to insure that the provisions of the permits are met. Section 35.925-10 of the EPA grant regulations makes the existence of an effective state program for operations and maintenance monitoring a prerequisite for the establishment of a municipal construction grants program. This follows with EPA general policy that the states will be the primary admi-

Figure 7-1

FEDERAL AND STATE SUPERVISION OF MUNICIPAL OPERATIONS AND MAINTENANCE


DWPC
Water Quality and Research Section
Annual Monitoring of Major Discharges
EPA
Surveillance and Analysis Section
Monitoring for Water Quality Studies Only
EPA
Municipal Facilities Operations and Maintenance Section
Annual Inspections and TA
MUNICIPAL WASTEWATER TREATMENT PLANTS
Monthly On-Site Inspections
Monthly Self-Monitoring Reports
DWPC
Regional Offices
EPA
Permits Compliance Section
Enforcement of NPDES Permits (joint)
EPA
Enforcement Branch

ministrators and enforcers of the Federal Water Pollution Control Program. In Massachusetts, DWPC has not taken over the NPDES program, but does do much of the inspection and monitoring. DWPC officials have stated that running the NPDES program would gain them nothing, so they have opted not to do so.

There are two interlocaking components of the operational surveillance system which will be addressed here. The first component encompasses on-site inspections of facilities by regulatory authorities. The second part of the program depends on regular sampling and reporting of results by facilities operators.

Inspections and Technical Assistance

As shown in Figure 7-1, both the State of Massachusetts and EPA Region I have on-going programs to monitor the management and operations of wastewater treatment facilities. The municipal facilities branch of EPA Region I carries out annual inspections of all major or Federally-funded municipal facilities. It puts first priority on operator training and technical assistance. At present staffing levels, Region I has the capability to complete a maximum of approximately 250 inspections per year.

The Massachusetts Division of Water Pollution Control carries out more frequent (approximately monthly) inspections of municipal treatment works. The same office also monitors industrial discharges on a schedule determined by the terms of the NPDES, and is on call for the monitoring of oil spills and pollution complaints.

If a serious problem is found, as part of one of these inspections, joint action is usually taken under the joint NPDES permits administered by Massachusetts and EPA. Major enforcement actions are referred to in the EPA Enforcement Section. Minor problems involving violations of only Massachusetts permits may be handled by the Commonwealth alone.

While there are many factors contributing to management and operational problems at treatment works, the lack of technical expertise is perhaps the most significant. Experience in the Region as well as the results of an EPA national study* indicate that operators are frequently underqualified and unable to apply the theoretical principles of plant operation in practice. As a result, many plants are not being run with acceptable process control.

Region I provides extensive Technical Assistance (TA) to about a dozen treatment works each year in an effort to improve operator and plant performance. Requests for TA have been received directly from the municipality or through the DWPC when serious problems have been experienced. Region I TA consists of anywhere from a few days to a few months of monitoring, fine tuning of process control and operator training. Frequently, technical assistance personnel recommend specific capital improvements to repair major design and construction problems. Significant improvements in operations and effluent quality have been achieved as a result of this program.

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*Gannett, Fleming, Corddry and Carpenter and M&I, Inc. Demonstrated Improved Performance and Reliability of Selected Biological Treatment Plants. DRAFT reports for EPA Contract 68-03-2224 and 68-03-2223, July, 1977.

Many consulting engineering firms are developing expertise in Technical Assistance, particularly as a result of EPA's grant program which provides funding for consulting services during start-up up of new facilities. However, many municipalities, particularly the smaller ones, lack both the incentives and the resources to contract for private technical assistance.

An EPA official in Washington stressed EPA's desire to see more private firms engaged in TA. The interviews suggest that local governments are only likely to fund TA under some form of direct or indirect compulsion.

The threat of enforcement action could provide the necessary local incentive. This approach would require a significant increase in enforcement and would stress the regulatory aspects of the program rather than the cooperative ones. It is the consensus of the Federal and state inspectors interviewed that the availability of free expert technical assistance, either directly from EPA or through contractors, would greatly increase the probability of improved plant operations. In other words, free provision of TA would be effective; TA requiring funding by communities would probably not work.

Monitoring and Reporting

All municipal and industrial facilities under the NPDES permits program must submit monthly reports on operations to both the state and EPA as part of the joint permit program. These reports contain records of plant operations based on analysis of influent and effluent quality as well as analysis needed for process control. The desired historic record provided by the treatment facilities' monthly submissions may be valuable to the operator as well as to inspectors. There is concensus that among those interviewed that the data collection should be continued. Submissions are reviewed by both Federal and state officials with follow-up performed by the state on problem plants.

Because these submissions are based on laboratory work carried out by the treatment plant staff, they constitute a record of self-monitoring. There have been a few cases within the study area where fraudulent reports were being filed and enforcement action has been taken. While the majority of reports appears to be honest, however, there are problems of laboratory quality control. Inspectors have little confidence in the accuracy of the reports.

The self-monitoring program seems to be identifying permit violations, since a significant number of reports exceeding standards are submitted. However, most officials interviewed feel that the program would be significantly improved if sampling capabilities of the regulatory agencies were increased.

The NPDES program requires that all major discharges be sampled for three consecutive days once a year and that a selected group of small dischargers be sampled for one 24-hour period each year. In Massachusetts, the state conducts this sampling program through the DWPC.

EPA Region I's Surveillance and Analysis Section does not monitor individual discharges on a regular basis. This Section is primarily concerned with conducting river basin studies and is not directly involved in the NPDES program. If results of a river basin study indicate that there are violations of NPDES permits, this information is forwarded to the appropriate offices for follow-up enforcement action.

When enforcement action is taken by EPA, additional reporting requirements are often set. In the case of the failure of the MDC's Nut Island treatment plant in January, 1976, EPA took such action. MDC is now required to submit bi-monthly reports on the status of operations and maintenance on all major pieces of equipment at the Nut Island facility. EPA officials felt that since the plant failure was the result of inadequate maintenance and since there was no adequate operations and maintenance management program at the facility, this requirement would force the MDC to maintain a record that it should have for proper operation. On the other hand, an MDC official indicated that the normal filing of a bi-monthly report is unnecessary now, and results in increased workload; the MDC does not feel that the report is required, since the Nut Island record-keeping system is operating well now.

Training Needs and Programs

One primary conclusion of an EPA national survey of operations at biological treatment plants* was that most operators are both under-trained and underpaid. Improvements in both of these would lead to better wastewater treatment and, presumably, better water quality.

Our research in the study area agrees with the results of the national survey. Pay scales in Massachusetts are generally too low to attract personnel with previous training, particularly for highly skilled jobs in the maintenance and operation of sophisticated mechanical equipment such as electric generators. Thus, the owners of treatment facilities must provide on-the-job training and expect to lose a high percentage of trained employees to other employment.

An equally critical problem is the availability of training for wastewater treatment plant operators. Based on a survey by manpower specialists in EPA Region I, it appears that there are insufficient academic programs in the area to provide staff for new plants being built in the area. The interviews indicated that two types of academic programs are needed. The first would provide training for plant managers and would combine four years' engineering training with practical on-the-job experience in wastewater treatment. There are no such programs in New England. The second type of program would provide training in basic skills needed by operators and would result in a two-year associate degree. There is insufficient capacity in adequate two-year programs in New England.

In addition to academic programs which provide training for new operators, there is a need for continuing training of operators employed at both municipal and industrial facilities. In Massachusetts, the Division of Water Pollution Control sponsors a series of courses on both the beginning and advanced levels. However, the number of spaces available in these courses will be cut in 1978 because of a budget constraint.

Federal participation in training programs is authorized under both P.L. 92-500 and the 1977 Clean Water Act. EPA's manpower staff indicated that the

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*Gannett, Fleming, Corddry, & Carpenter, *op. cit.* and M&U, Inc., *op. cit.*

national policy calls for EPA participation in support areas such as curriculum development, with the states assuming responsibility for actual training. As indicated above, the Commonwealth may not be providing adequate funding for training. While the 1972 amendments to the FWPCA authorized fairly extensive participation in training, budget authorizations have never been commensurate. For the past several years, the Federal budget has allocated $650,000 dollars for training with approximately $50,000 going to Region I for all training programs. The 1977 amendments increase the scope of possible Federal participation in training programs. For example, funds may be used to purchase various types of equipment including mobile units. However, adequate funding still has not been forthcoming, so it is clear that these training provisions of the Act will not be carried out. The poor performance of wastewater treatment facilities has been well documented in Boston. Because of this poor record, consideration should be given to increasing the emphasis on operator training programs.

Provisions are made under the construction grants program for assisting in the construction of a training facility in Region I. Initial studies in Massachusetts favored the location of a permanent training facility at an AWT plant on the western edge of the study area. However, the matter has now been under consideration by an Ad Hoc committee, established by the Massachusetts Department of Environmental Quality Engineering. It is reasonable to speculate that the state is hesitant to make a commitment to a permanent training facility when it is presently having to cut back on its existing training program for lack of funds.

7.2 IMPACT OF FINANCING PROCEDURES ON THE MSD AND OTHER DISTRICTS

Chapter 6 described the budgeting and financing process of the MDC, which involves review and revisions of the MSD budget as part of the state budgetary process. In brief, the MSD prepares its budget, which is then revised within EOEA, by the Governor, and by the General Court. MDC payments are included in the net assessments or aid received by communities, and paid to the Commonwealth's General Fund, which then provides funds to the MSD. The EPA audit* describes the effect of this process:

> "Although the Sewerage Division is self-supporting, its annual budget is subjected to the same politically-based limitations, such as austerity programs, spending ceilings, etc., as are all other segments of the Executive Branch of the Commonwealth's government. As a consequence, the Division does not receive all the funds needed to ensure continuing, efficient operation."

The audit also states explicitly that

> "The Sewerage Division has not been adequately funded for the past several years. Lack of funds...was the most significant factor contributing to the breakdown of (Nut Island) as well as other operational problems..."

This view was supported uniformly by the officials interviewed. It is clear that lack of control over its own budget is a factor in the Sewerage Division's lack of funds, and therefore strongly affects operations and maintenance. While budgetary management problems exist in the MDC, and are documented in the audit, the major difficulty is that the state has little incentive in its budgeting to provide sufficient funding for the MSD.

Under a stringent budget ceiling, only certain parts of the system operation can be curtailed. Fixed costs, such as principal and debt service payments, and semi-fixed costs such as salaries, fuel, and chemicals accounted for well over 95% of the MSD budget. This left only $430,000 in 1976 for maintenance and repair of all MSD facilities including two primary treatment plants with a combined capacity of over 400 MGD, numerous headworks and pumping stations, and hundreds of miles of sewers.** The majority of MSD facilities are over twenty years old and thus require extensive maintenance.

The following were among the EPA Audit Report's recommendations:

- provide adequate staff for proper operations and maintenance record keeping;
- require preparation of a sound budget without imposed ceilings;

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*EPA Office of Audit. Joint EPA/Commonwealth of Massachusetts Task Force Investigation of MDC Facilities; Report on Review of Budgeting and Funding Functions; Audit Report No. E706-01-234-119, November 1, 1976.

**Ibid.

o process and approval of the budget with only technical review.

Since then, EPA has required certain repairs, and imposed O&M monitoring and reporting requirements on the MDC as part of the NPDES permit. However, major changes in the budgeting process have not taken place.

User Charges and Industrial Cost Recovery

The other noteworthy portion of the MSD financing structure, as mentioned in Chapter 6, is the relative lack of community concern for cost allocations and charge. At present, the communities have no incentive to reduce their flow into the MDC system. Flow is not monitored, and "flow-based" allocations are based on population equivalents and water use for some major industries. In most areas, the payment by individuals and firms is based on assessed value, rather than sewage or water flow. Infiltration and inflow into community sewers is not measured; costs from I/I are averaged over all communities.

While the proposed systems will charge individual user in the communities according to their flow, they will not charge communities for I/I from their sewer systems. No monitoring of actual flow from the communities to the MSD is planned. An I/I analysis and survey has been performed, but concentrated on the MDC portions of the system, not the associated communities.* The only controls on I/I from the community systems, therefore, appear to be in the agreements between the MSD and its member communities. MDC officials have stated that it should be possible to direct communities to repair their I/I problems. In addition, 25 of the communities also plan to be grantees under the program, and must perform I/I analyses for at least portions of their sewer systems. At this point, however, it appears from preliminary reports that all communities exceed the 1000 gallons per inch diameter per mile per day I/I which has been the EPA measure of "excessive."*

The proposed User Charge and ICR systems may cause other problems, primarily administrative ones. The joint system proposed by the Arthur Young report** requires cooperation between the community and the MDC; if this cooperation is not forthcoming, it will be difficult for the MDC to achieve the requirements of P.L. 92-500. However, Chapter 814 of the Acts of 1975, which revised the financing procedures of the MDC, included

> Requirements for the communities to adopt and administer UC/ICR programs. Such programs are subject to the approval of the MDC.***

The work by Arthur Young & Company is an attempt by the MDC to minimize the burden on communities of implementing this requirement, while still meeting the requirements of the Federal law. As such, the report concentrates on the user charge provisions, since they must be met earlier in the grants process than the ICR requirements. It appears that the MDC has the necessary powers in this area, and implementation should be possible, particularly since 25 of the 43 communities must develop their own UC/ICR systems in obtaining their own grants.

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*Camp, Dresser, & McKee. DRAFT Infiltration/Inflow Study of the Deer Island System. August, 1977; and, Fay Spofford & Thorndike. DRAFT Infiltration/Inflow Study of the Nut Island System. December, 1977.

**Arthur Young & Company. Final Report on a Conceptual Design for User Charge and Industrial Cost Recovery Systems. May, 1977.

***Ibid.

Reactions to Operations and Maintenance Costs at Other Facilities

As more Federally-funded wastewater treatment plants come on line, the true impact of operations and maintenance (O&M) costs on local governments is beginning to be felt. In many cases, these costs are higher than originally anticipated, and the public is angry.

An investigation into the actual cost of operations and maintenance at several eastern Massachusetts wastewater treatment plants built under the Construction Grants Program shows that many communities have had similar experiences. The estimated quantities of chemicals, energy, and labor needed to run the plants have been reasonably accurate. However, the prices of these O&M components, particularly energy and chemicals, are higher than estimated, by up to several hundred percent: costs have risen accordingly. (see Table 7-3). The rate of cost increase has been much faster than inflation in the general economy.

There has been public pressure to cut O&M costs in any way possible, including staff cuts, running the plant at less than optimal process control, seasonal operation of nutrient removal, and eliminating funds for future equipment replacement.

In New England, there have been requests to "turn off" certain costly processes at AWT plants within a short period after start-up. One such case in the study area involved the AWT plant located in Marlboro. The town requested, with state approval, that its discharge permit be modified to permit only seasonal rather than year-round phosphate removal, greatly reducing O&M costs. The state recommended that the request be granted until the completion of a U.S. Army Corps of Engineers study of the receiving water, after a public meeting at which several citizens complained about the condition of the receiving waters, Region I officials decided to continue the requirement for year-round phosphate removal until the Corps study is completed. Regional officials are concerned that the number of such requests will increase as more AWT plants come on line.

In cases where residential user charges are within the acceptable range defined by EPA, voter willingness to support adequate O&M budgets appears to be questionable. In one jurisdiction O&M costs have been below estimates because of low flows, and even in this case there has been considerable adverse public reaction. In another community where there has been strong opposition to a relatively low user charge, local officials are using every available tactic to avoid upgrading to AWT, which would result in a fourfold increase in the charge. Facility managers indicate that treatment of wastewater is not seen by the public as a vital municipal service. When compared with more visible services such as roads, schools, police, snow removal, etc., wastewater treatment receives low priority. Users tend to perceive the system as adequate as long as the sewage is transported from their yards.

While the communities have reacted strongly to high O&M charges, they did not react to the capital costs of the plants in a similar manner. In Fitchburg, for example, the bond issue was voted by the city council, partially to support industry through joint treatment. It was not until the first sewer bills were issued that the citizens reacted. Interviews with engineers do show, however, that it is more difficult to obtain funding from town meetings than in cities, and several have claimed that there is more awareness of O&M costs now than in the past. The existing plants were often voted under court order, when the communities felt they had no choice; even there, however, the debates focused on capital, not on O&M, which was expected to be "small."

The method of collecting funds and approving budgets for operations and maintenance also affects public reaction. From a small sample of communities, it appears that there is more likely to be public reaction in areas where separate sewer bills are sent out than in areas where the charges are hidden in the ad valorem tax. Under the 1977 amendments to the FWPCA, this difference has been eliminated, since citizens will now have to be notified what portion of their tax goes to wastewater treatment.

There appear to be two public financing assumptions behind the user charge requirements of the construction grants program. First, it is assumed that individual citizens should know exactly what their share in O&M is; it also assumed that if they are given sufficient information about the benefits gained and the needs of the facility they will support operations and maintenance budgets.

Given the experiences of the MDC sewer district, it appears that a lack of information leads to a lack of support. However, it is not clear that the citizens are more willing to pay when they know what the O&M costs are. In fact, the least resistance to adequate O&M funding in our area appears to occur where a sewer commission is responsible for budgetary approval and the user charge is simply incorporated into the ad valorum taxes, without direct budgeting control by the users.

Judging from the experience of communities which have recently constructed facilities in eastern Massachusetts, there is considerable need for improvement in the process of both calculating O&M costs and presenting them to the public in an understandable form. It is important that the relative costs of operations and maintenance be correctly included into facilities planning process and that the public have a clearer understanding of what they will pay.

EPA, in PRM 76-3, made an important first step toward this goal by requiring that local costs be presented to the public in an easily understood fashion, such as the typical annual cost per household.* It is generally felt by the people interviewed that the implementation of this EPA policy has improved public awareness of local costs and anticipated user charges for current projects. In some cases, this increased public awareness has led to considerable debate over selection of alternatives and the necessity for upgrading of treatment capabilities.

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*J. Rhett. "Presentation of Local Government Costs of Wastewater Treatment Works in Facility Plans." EPA PRM 76-3, August 16, 1976.

One claim of the nominal process is that communities which actively consider costs in choosing the abatement alternative will then accept the resulting O&M costs. There are problems with the claim, however: first, O&M costs are generally underestimated in current planning. Second, public participation may not bring the costs to the notice of the individual taxpayers. Finally, even a commitment by the community may not lead to long-term O&M financing, particularly without effective enforcement. Efforts to improve public awareness early in the process, and to correctly estimate future costs are a portion of the solution, but the local evidence suggests that they are not sufficient.

7.3 LONG-TERM PLANT MAINTENANCE

While EPA is authorized under the NPDES permits program to monitor and enforce effluent standards at both municipal and industrialtreatment works, there is no such authority to oversee regular maintenance. Such maintenance may not directly affect effluent quality, but it is necessary for long-term operation.

There is little incentive for local governments to maintain their plants. They are under strong pressure to reduce O&M costs, and they can allow the plants to deteriorate while still meeting the NPDES standards; in fact, tightening of NPDES enforcement is likely only to divert more funds into operation, and leave less for maintenance. Communities also seem to expect Federal assistance for future plant failures, assuming that the Federal government will act to protect its investment. This is supported by grants which have been provided to communities for correction of design errors which have made the plants inoperable. PEA's lack of ability to oversee regular maintenance simply allows the communities to allow their plants to deteriorate, trading off future expenses (which they believe are likely to be Federal) against current local costs.

The situation is different for industry. Industrial pollution control facilities are built with private funds, and there is no Federal subsidy for capital costs, either currently or expected, for the future. Therefore, industry has an incentive to make the facilities last as long as possible, and an accurate perception of life-cycle costs.

The experience at older MDC treatment plants in the study area supports deferred maintenance and suppotrs the communities in their anticipation of future Federal help. Nothing in our study indicates that the situation will be substantially different for plants built under the Construction Grants Program. EPA has no leverage over local financing for operations and maintenance until non-compliance occurs, and only limited options then. Inspectors interviewed indicated that some municipalities have neglected maintenance and replacement responsibilities, taking the attitude that if things get bad enough, the Federal government will bail them out.

In extreme cases, such as the total shut-down of the MSD Nut Island facility, EPA does have the authority to require owners to remedy the situation. However, this authority is usually too-little-too-late, and definitely does not support the goals of water quality or effective financial management.

Plant design is another important factor in proper plant maintenance. Components which are improperly designed or sized can lead to recurrent maintenance problems. Thus, the durability and accessibility of various components should be evaluated in addition to performance capabilities during plant design and review. Operations and maintenance should be carefully considered during the design review process, as outlined in Chapter 5. EPA has generally supported the correction of obviously inadequate design or construction in the Region, through TA and additional construction grants support.

Most regulatory officials interviewed agreed that it will be very difficult for the Federal government to avoid participation in O&M financing if water quality goals are to be met.

While there is some skepticism on the part of regulatory officials about the ability of the Federal government to administer an operations and maintenance program through the states, most interviewed officials see Federal assistance as the easiest solution. It is very likely that the heavy subsidy for plant construction has raised expectations that such assistance will be forthcoming.

7.4 CONCLUSIONS AND RECOMMENDATIONS

The nominal process described in the introduction to this chapter limits Federal involvement to construction funding, with minor activity by the Federal and state governments in enforcing compliance with NPDES permit conditions on a few recalcitrant dischargers. Small amounts of technical assistance and training are to be provided but, in essence, it is assumed that communities receiving support for construction of wastewater treatment plants would generally proceed to operate them effectively over the design period.

This does not appear to be the case, and more Federal and state involvement will probably become necessary. There appears to be little incentive for communities to attempt to meet discharge standards on their own since this will benefit downstream uses while costing them money. The current enforcement process, based on limited inspections and self-monitoring, does not appear to provide a sufficient incentive. Operators are undertrained and underpaid, and recive limited technical assistance to guide them in running the plants effectively. Where costs are known to the community, or are not controlled autonomously by the wastewater agency, there is a strong reaction from local taxpayers to the charges, and attempts are being made to reduce budgets. This is accentuated by the high relative inflation in the system, particularly for materials, which has resulted from program growth. Even where water quality goals are being met, there is little concern for continuous operation, and for the maintenance, repair, and replacement of equipment. The Federal government is viewed as the provider of capital and the first result of budget limitations is reduced equipment maintenance.

Recommendations

In the short-run, there are several actions which EPA and the Commonwealth could take to improve O&M performance. Increased enforcement effort is clearly required, but should be combined with increased training and technical assistance; the communities will not, of themselves, be able to operate their plants correctly and effectively. Training and technical assistance may provide the capability, while enforcement could provide the incentive through fines at denial of grant payments.

This recommendation is short-sighted, however, since there are two areas which it does not address. First, communities have a real concern with costs, which does not become apparent in facilities planning. This is a distributional issue, since the people concerned with plant design may not be those who pay for plant operation; it is discussed in Chapter 8. Second, even given technical assistance and enforcement, communities may have little incentive to keep the plant operating in the long-term. EPA does not have authority to ensure that plant operators take good care of their equipment; massive breakdowns are currently expected to be repaired using Federal funds, and communities expect the Construction Grants Program to continue. The Federal government will have to protect its investment in some manner, and this may be an area where further legislation is required. This is an extremely important area for analysis, and one which EPA should address before the current investments are wasted because of insufficient maintenance.

CHAPTER 8

OVERALL PLANNING AND INSTITUTIONAL ISSUES

The preceding chapters have proposed a nominal framework for wastewater planning (See Figure 8-1) and then contrasted the actual workings of each individual stage against that framework. The scheme of this chapter is to discuss the institutional aspects that cross lines between planning stages. It is a short chapter, since most of the supporting documentation is contained in Chapters 3 to 7. However, it is an important one, since we are concerned here with how the pieces fit together, and with the ways decisions actually get made.

Section 8.1 analyzes how the various levels of the process consider environmental and economic impacts, and with what results. Section 8.2 then presents an analysis of how public participation works in the various planning stages. In Section 8.3, the relative effectiveness of the other participants at the Federal, state, and local levels is reviewed and measured. Finally, 8.4 presents our conclusions on how the real process compares to the nominal one, and our recommendations for possible Federal action to affect the overall planning and implementation process.

8.1 CONSIDERATION OF PROGRAM IMPACTS

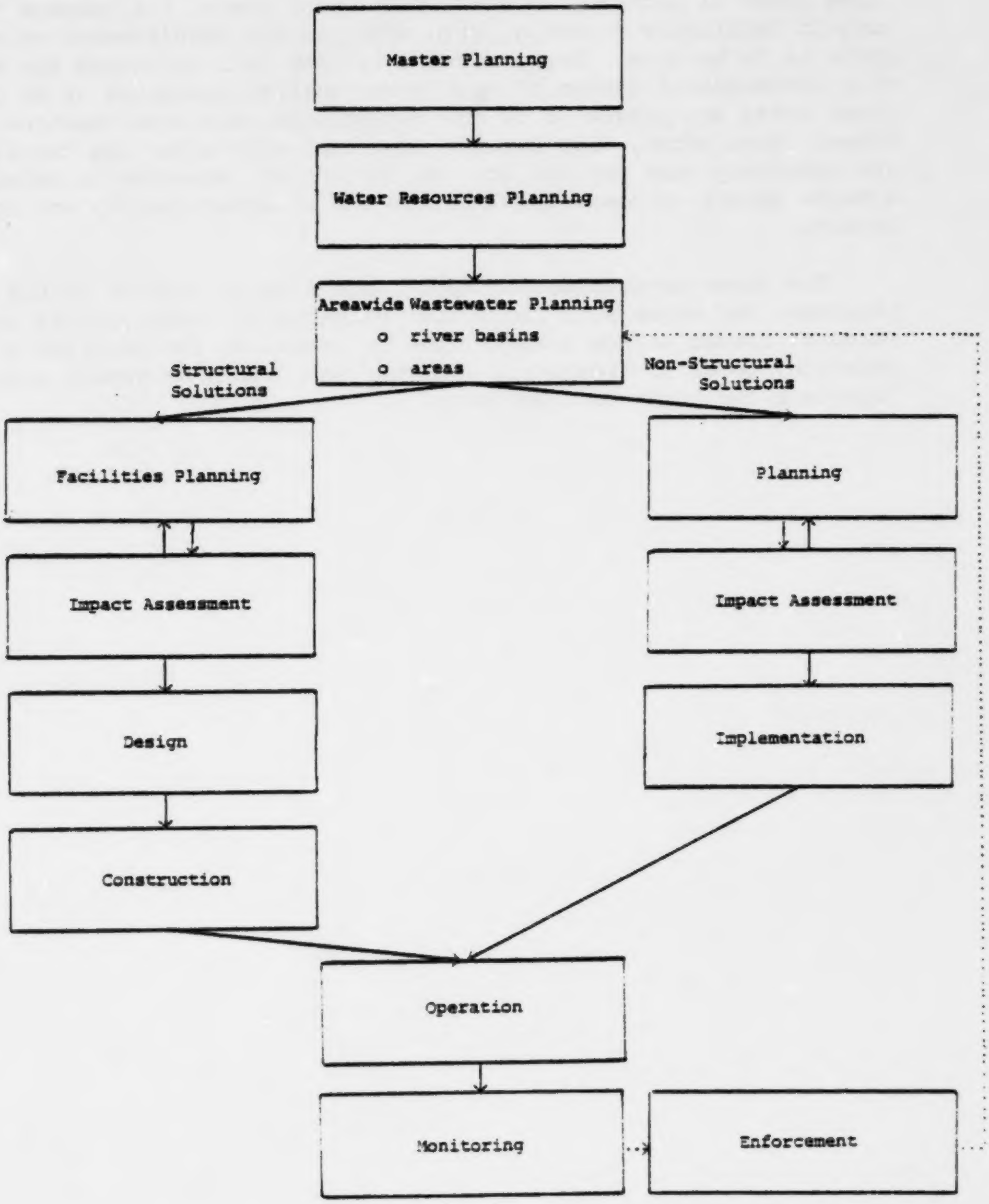
The nominal process provides a specific step for impact assessment, following the development of plans and preceding their implementation. In reality, it appears that both assessments and concern with impacts occur throughout th[illegible]ocess, but in varying ways.

In Master Planning, the analysis of expected impacts was the major focus, with goal formulation efforts attempting to determine which impacts were most important. The same was true in the 208 and 303e processes, through they did not use the results of SENE effectively. The priority list is defined and facilities are planned in an attempt to abate pollution, but generally without considering the objectives and impact estimates (including those on water quality) developed in the "higher" levels of planning or alternatives besides the conventional ones. Once facilities are designed or 208 plans formed, environmental assessment and cost-effectiveness analyses are performed. These steps have some technical problems, but they form an important part of the process.

With respect to water quality, concern is predominant in the early stages, through the master planning and the 303(e) studies. But these are then disregarded in favor of professional judgment in determining which facilities to fund,

Figure 8-1

WASTEWATER MANAGEMENT PROCESS


Master Planning
Water Resources Planning
Areawide Wastewater Planning
o river basins
o areas
Structural Solutions
Non-Structural Solutions
Facilities Planning
Impact Assessment
Design
Construction
Planning
Impact Assessment
Implementation
Operation
Monitoring
Enforcement

and there is little interest in water quality at the later stages. Plants are designed to meet secondary treatment requirements, or in some cases AWT, but their real impact on water quality is seldom an issue.

Cost is only considered in a cursory manner at the areawide and regional planning levels, as shown in the 208 project analysis which only included large pipes (over 21 inches), in evaluating local costs. It becomes the primary concern in facilities planning, with detailed EPA requirements on how the cost analysis is to be done. Every attempt is then made to design the most cost-effective conventional system to meet water quality standards at an individual site. These costs are presented to the communities, and some reaction is received at times. More often, cost becomes important only after the facility is built and the community must pay for it; at that point, attempts to reduce cost can have a major impact on operating lifetime and on water quality and other environmental impacts.

The other environmental impacts are a major concern of the Level B and 208 programs, and enter into facilities planning in controversial areas. The overall regional issues seldom seem to have an effect on the detailed planning, but site location, local environmental impacts, and growth/no-growth questions are extremely important for individual projects.

8.2 PUBLIC PARTICIPATION THROUGHOUT THE PROCESS

Public participation in some form or other occurs in every stage of the process. SENE, for example, was in many ways a goal formulation exercise, and the public participation by interested citizens was an important part of its work. Similar intense involvement in the comprehensive issues has been shown in the 208 CAC, the BHCAC, and the EMMA public participation efforts.

In all these cases, a relatively small group of citizens has participated extensively. In all cases, they have tried to broaden the issues of concern in the particular study, to make the analysis more comprehensive. They have attempted to look at overall cost-benefit considerations, including water supply, recreation, land use, and water quality--not just at the best programs for individual towns or the locations of individual plants. Considering the weak implementation of the SENE recommendations, these private citizens appear to have been the real comprehensive planners.

Most of them have come from environmental organizations. They have had limited resources, and none of the involvement efforts, except SENE, have attempted to educate them about technical issues. In many cases, they have not received answers to the questions they raise, which seem to be "outside the scope" of each individual plan. Their concerns, however, are important ones, and should continue to be raised until satisfactory answers are given: as described above, water quality and other environmental impacts seem to be ignored in the later stages of the process; these members of the public provide the dominant official voice for those issues.

There is a second form of public involvement which has been significant: the public reaction to direct impacts. This has been shown in the site location under EMMA and the Treatment Plant EIS, where public opposition to sites in Qunicy, the Neponset Basin, and the Mid-Charles Basin has been extensive. Many community residents have turned out, and political action in the communities has been effective. EPA claims that the public opposition to Nut Island expansion will probably lead to moving the plant (perhaps with all secondary treatment at Deer Island), and that it will take the recommendations of its Site Evaluation Committees for the satellite plants.

Local public action was also responsible both for attempts to turn off phosphorus removal at Marlborough, and for continued operation of that portion of the system pending study. Public action has been effective in reducing wastewater treatment budgets in a number of communities. In the local issues, therefore, the public seems to be effective. Those concerned with neighborhood impacts are active in the planning stages where site location decisions are made; those concerned with cost become active when costs must be borne.

These types of public participation show a major weakness in the process, however. In the early stages, the "public" that participates are members of environmental groups, perhaps with some business representation where particular issues (such as pretreatment) are discussed. Later on, the people affected by the local impacts of a plant become active -- those concerned with their neighborhood, or with growth control in their town. Only at the end of the process do the taxpayers show a major interest, when it is too late to affect anything besides plant operation.

Further public involvement at the town level would be desirable during Step 1, so taxpayers organizations, business groups, and others should be brought into the process in the earlier stages. However, there has been no success in getting such involvement so far, and it may be difficult to achieve.

Budgets for public participation in the areawide and regional studies have run about 10 to 15% of total study costs, in some cases including staff time and printing and distribution of publications. This appears adequate for the current methods. However, almost no public participation funds are included in Step 1 plans, where the towns could become more involved. Newsletters, information materials, and meetings might all be helpful in gaining long-term town support, and resources should be allocated for public participation in facilities planning.

8.3 THE ROLES OF VARIOUS PARTICIPANTS

U.S. Environmental Protection Agency

The EPA is, of course, the source of funds for construction grants, and the Federal agency most concerned with the implementation of P.L. 92-500. It should be viewed as two distinct parts: the national EPA, which issues policy guidance and prepares regulations, and Region I, which is concerned with the actual implementation of the various programs, and which has the following responsibilities:

- approval of the state 303e plans and Continuing Planning Process;
- supervision of the grants under Section 208;
- approval of the state priority list;
- approval of Step 1, 2, and 3 grant applications;
- preparation of Environmental Impact Statements under NEPA;
- annual inspection of major public discharges;
- support of training programs, where possible;
- limited technical assistance;
- enforcement related to permit violations (a growing program).

Thus, Region I is concerned with all major phases of the process, though it has concentrated on grants and on environmental assessment. Its emphasis has been on grant supervision, both for 208 programs (with a focus on implementation) and for 201 projects. The EIS process has been used primarily for grant supervision, to analyze impacts and secondarily to help determine which alternative should be supported by the agency.

Other Federal Agencies

Aside from its performance of the SENE study, the involvement of NERBC has been slight. The Corps of Engineers has been a participant in EMMA and other studies, but has (to date) provided primarily technical knowledge, and has not had a direct role in program operation. This is likely to change under the EPA/Corps agreement, but the NERBC and Corps have been peripheral to this point.

The Division of Water Pollution Control

The Division is the operating agency for the program in the Commonwealth. DWPC supervises construction grants, prepares the River Basin Plans and the state priority list, and performs inspections after plants are operating. It is also responsible for operator training.

DWPC is primarily a construction agency, with river basin planning and inspection both supporting functions. Its goal is to build plants that will abate pollution, and it has difficulty evaluating other alternatives. The Division uses its powers to limit the options open to communities, reducing the set of those it thinks will work. Thus, it has a major effect on the number and types of plants that are built in the Commonwealth.

Other State Agencies

DEQE, which is DWPC's parent agency, also has some direct responsibility. DEQE has the major environmental permit responsibilities, including wetlands, sludge and septage management on land, and on-site disposal. DEQE will have the management role under the 208 plans for the area, though portions of this may be given to DWPC and the towns.

Elsewhere in EOEA, the Coastal Zone Management Office and the Environmental Impact Review Office both comment on plans but do not act directly in the process. The role of the Water Resources Commission is growing, but is not yet significant. The MDC will be considered below.

Despite efforts over the past few years, the Office of State Planning has only a minor role in the process. OSP's development of a state growth policy could be important if it is implemented by the communities, but this has not yet occurred.

The major role of the General Court to date has been in limiting the budget of the MSD to an inadequate amount. This is expected to continue.

The MDC, a State and Regional Agency

As the major supplier or wastewater service in the study area, the role of the MDC should be significant. It has initiated plans for various facilities, entered into contracts for planning and design, and must operate the existing facilities. However, it is relatively unimportant at this point in the process of planning its own facilities. EPA is determining which option will be grant eligible through the EIS. The General Court sets its budget at an inadequate amount, and it has no recourse in plant operation. Its own technical staff is small, so it must rely on consultants for most of the work.

The MDC could be faulted for not having taken a more active role. For example, study of the effects of its offshore discharge of effluent would be extremely valuable now, when that option might be available, given supporting data. In general, the MDC has responded to the actions of others, and it might be in a better position if it had taken more initiative.

The Metropolitan Area Planning Council

The MAPC has performed the 208 study for the area, but has had little other impact on the wastewater management in the region. It also appears that the 208 study, which is expected to be primarily a compilation of pre-facilities plans, will have little impact, given reaction from the towns most involved in the wastewater planning. Since the study did not really address the areawide issues, it will probably be implemented when particular towns find the recommendations convenient, and this is likely to lead to only minor improvement in wastewater planning for the region as a whole.

Local Communities and Consultants

Local communities are, in theory, responsible for much of the wastewater planning effort. In actuality, their range of choice is limited by the requirements of EPA and DWPC, and they must design within these constraints. Or, rather, their consultants must do so, since the local communities have little expertise themselves. The local communities have some veto over the alternatives analyzed, or over the plan as a whole, but this is limited. They have some control over funding, particularly for operations and maintenance, but this depends on the plant operating within reasonable limits for effluent quality. Some communities have been active in alternative selection; most, however, have been generally responsive to the requirements of DWPC and EPA up until the plant begins to operate, and are preoccupied with costs thereafter.

The consultants to the communities perform most of the detailed work on the program. They prepare the actual Step 1 plans and the designs in Step 2, working with the communities and the other agencies as necessary. In theory, they simply serve the communities; in actuality, their role is more complex, and they have an important influence on the process as a whole. Since only the consultants bring real technical expertise to bear on each individual facility, they determine both the types of systems which are built, and the performance which those systems achieve.

Industry

Industries have not been major participants in the wastewater planning process for the region. Industrial organizations have been concerned with specific topics, such as the allocation of Industrial Cost Recovery, and the potential pretreatment requirements for the MDC system. Industries with direct discharges have made progress in complying with their NPDES permits, but industrial discharges to the MDC have required little pretreatment to date. The industries, therefore, have only become involved in a few parts of the process, and have not been major participants in the wastewater planning for the area.

8.4 CONCLUSIONS

Construction Grants dominates the wastewater planning process in the Boston area, and those portions of the process which are not directly related to construction grants receive little emphasis. The reason is simple: the Construction Grants Program has far more Federal funding than any other part of the program, and most of the non-environmental benefits of the Clean Water program -- whether political, administrative, or professional -- are tied to this funding. In the Boston area, those programs which do not affect Construction Grants are much less significant than those which do.

The programs directed at water quality planning -- "Level B," 208, and the Basin Plans under 303e -- have, at this point, little direct relationship to Construction Grants. If implemented, the 208 plan will affect facility planning, and the 208 effort was primarily directed at needs for structural facilities; however, this was done by minimizing the concern of 208 with non-point sources and nonstructural controls.

The enforcement of NPDES permits has become tied to construction grants, with the major efforts directed at ensuring that the necessary facilities are constructed, (and lower priorities for communities which have completed their facilities), or which are in violation while working on obtaining grants. The EIS process has been tied to the Grants program, and is being used by EPA for detailed facility planning of the sort done in Step 1 plans, rather than for broad environmental reviews of significantly differing alternatives. Within construction grants itself, the major issues arise in disagreements among the grantees and the regulatory agencies about which treatment alternatives are appropriate for particular situations. These disagreements are seen as extremely important by all parties.

However, Construction Grants are only part of the whole process. Before water quality can be improved, the facilities have to be built to serve the most important problems, and they have to be operated and maintained. There is little evidence that the Priority List process is concerned directly with water quality -- it is aimed at maximizing pollution abatement from point sources which is not the same thing;* similarly, the Construction Grants process does not ensure operability of the facilities, either through quality control over the designs, or through ensuring that the communities will operate and maintain them once they are built.

The recommendations summarized below attempt to provide marginal changes which will broaden and improve the process without requiring major redesign. Most of the necessary elements exist already, and it is simply a matter of using them correctly.

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*For example, it has been stated by many interviewees that secondary treatment at Deer Island, which would greatly abate pollution discharge, would have almost little if any impact on water quality.

8.5 RECOMMENDATIONS

Our recommendations fall into two groups:

- those which increase consideration of comprehensive planning issues (such as water quality improvement) in Construction Grants;
- those which increase local flexibility in implementation, and provide local incent ives for operation and maintenance.

Within the first group, we believe that it is important to get water quality, land use, recreation, growth, and related issues considered in Construction Grants. We believe that there are three ways to do this. The first is to use the Basin Planning process to directly influence the state Priority List, perhaps through an explicit procedure tying the two efforts together, or simply through increased public participation in Priority List development. The second is to use the 208 process to address specific areawide issues, under the framework of objectives set by current 208 and "Level B" efforts -- the individual 208 studies could then become part of the 208 plan, which would affect facilities planning. The draft 208 Basin Reports are too broad and shallow to greatly affect facilities, but detailed nonstructural studies or non-point analyses of individual basins might lead to improved facilities plans. Finally, the EIS process could bring concern with impacts and alternatives into facility planning, but this will only happen if the EIS is used to analyze a broad set of alternatives, rather than a set of localized variations which only support facility recommendations. All three of these approaches, plus general increases in public participation through existing institutions such as the Boston Harbor CAC, could make the Construction Grants Program more responsive to the water quality needs, and this would be desirable.

At the other end of the scale, we believe that Construction Grants should attempt to be flexible enough to meet the needs of individual communities, within the limits set by the effluent standards and NPDES permits. For example, we recommend that EPA and MDC work together on facility planning and EIS preparation. We recommend that communities be allowed to build any facility which will effectively abate pollution as required, with the Federal share tied to the costs of the most cost-effective option. NPDES enforcement should be focused more on permit requirements and performance schedule, and less on the details of the grants process. We believe that non-structural controls should be considered in community Step 1 plans, and that the Commonwealth and EPA should be willing and able to evaluate unconventional options, where they may be appropriate. To ensure that the communities know what is required, we recommend thatthe cost-effectiveness analysis procedures be revised somewhat, and that costs be presented in an extensive Step 1 public participation program. We also recommend that EPA describe to communities the limits of Step 2 review, and provide assistance to them in obtaining outside review to ensure that the plants will work.

To provide the necessary incentives for O&M, we recommend that enforcement of NPDES permits be increased, with associated training and technical asistance to aid the communities in developing a capability to operate the plants effectively. This should result in improved operation, but it appears that new legislation will be required to eliminate problems from deferred maintenance, and protect the Federal investment.

We believe that these are changes which can be implemented under the current structure, and that they could potentially lead to increased water quality benefits (from tying the grants more closely to water quality needs); reduced construction delays (from allowing the communities more flexibility in their options, and thus resolving disagreements); and improved facility performance (from O&M support and enforcement, combined with providing the communities with more information earlier in the process). All of these changes appear desirable for program performance, and the overall goal of clean water.

APPENDIX A

LIST OF INTERVIEWS

INTERVIEWS CONDUCTED

William Anderson, Kennedy Engineers, San Francisco.

Hibbard Armour, Region I, Chief Operations and Maintenance/Municipal Facilities Branch, Environmental Protection Agency.

Rita Barron, Director, Charles River Watershed Association.

Libby Blank, Director, Environmental Planning, Metropolitan District Commission.

Hans Bonne, Head Industrial Waste Section, Division of Water Pollution Control.

Boston Harbor Citizens Advisory Counci. In Attendance:

- Herbert M. Meyer, Mystic River Watershed Association
- Fifi Nessen, Boston.
- Waldo Holcombe, Neponset Conservation Association.
- Ray Gadsbey, Winthrop City Government.
- Madeline Kolb, MEPA Unit, EOEA.
- Daniel O'Brien, Environmental Protection Agency, Grants.
- Eugenie Beal, Boston.
- John R. Elwood, Metropolitan District Commission.
- Shirley Brown, Natick.
- John E. Murphy, Boston Harbor Pollution Committee.
- Lydia Goodhue, CRWA.
- Marian Ullman, League of Women Voters.
- Bernie Sacks, Environmental Protection Agency.
- Barry Jordan, Environmental Protection Agency.
- Charles Mason, Citizen.
- Edward Phalan, Public Works Department, Boston.

John Brady, Government Liaison, Whitman and Howard, Inc.

Larry Brill, Operations Specialist, U.S. Environmental Protection Agency, Region I. Previously Sanitary Engineer, Deer Island.

Shirley Brown, member EMMA and EIS site evaluation committees.

James Callaghan, Director, Passamaquoddy Tidal Power Project. Formerly, Chief, Urban Studies Branch, U.S. Army Corps of Engineers, Waltham, MA

Daniel Caughlan, Massachusetts State Coordinator of Grants, Environmental Protection Agency.

Vincent F. Ciampi, Manager, Special Projects, NERBC.

Thomas Conroy, Project Director, MAPC Water Quality Project

Kathy Conway, formerly Sanitary Engineer, Operations and Maintenance Division, Region I, U.S. Environmental Protection Agency.

Bernard Cooper, Assistant to the General Manager, Town of Norwood.

Allen Cooperman, Associate Sanitary Engineer, Water Quality Division, Division of Water Pollution Control.

Philip Cummings, Counsel, Senate Environment and Public Works Committee.

Robert Cutone, Camp, Dresser, & McKee.

Paul Dadak, Permits Engineer, Eastern Massachusetts Permits; Permits Development Secretary, Environmental Protection Agency.

Anthony DePalma, Section Chief, Construction Grants, U.S. Environmental Protection Agency.

David Deese, Harvard University; John Kelly, Woodshold Oceanographic Institute.

Mark Deming, Engineer, 208 Water Quality Study, MAPC.

Dan Donahue, Project Engineer, Metcalf & Eddy.

Peter Dore, Sanitary Engineer, DWPC; member of Joint Task Force.

Steven Ells, Director, Congressional and Intergovernmental Relations, U.S. Environmental Protection Agency, Region I.

Thomas Engellenner, Attorney Advisor, U.S. Environmental Protection Agency, Region I.

Andrew Fisicelli, Assistant Director, Sewerage Division, Metropolitan District Commission.

Lydia Goodhue, Charles River Watershed Association, Boston Harbor Citizens Advisory Council.

Richard E. Greeley, Chief of Construction Grants, Division of Water Pollution Control.

Judith Guttman, Treasurer, Ipswich River Watershed Association.

Dana Hansen, Vice President, Ipswich River Watershed Association.

Waldo Holcombe, 208 Citizens Advisory Council, on Boston Harbor and EMMA Citizens Advisory Councils.

R.J. Holthaus, Superintendent, Deer Island Treatment Plant, Metropolitan District Commission.

Warren Howard, Massachusetts Water Quality Section, Environmental Protection Agency, Region I.

Rodger Janson, Sanitary Engineer, Construction Grants, U.S. Environmental Protection Agency.

Barry Jordan, Public Participation Specialist, Environmental Protection Agency, Region I.

Amcs Kent, Massachusetts Board of Registration, Chairman.

Warren Kimball, Chemist, Water Quality and Research Sections, Division of Water Pollution Control.

John Kingscott, Sanitary Engineer, Facilities Requirements Branch, Environmental Protection Agency, Washington, D.C.

Madeline Kolb, MEPA Unit, EOEA.

Professor Ladd, Massachusetts Institute of Technology; President, Boston Society of Civil Engineers.

James Lew, Engineer, Camp, Dresser, & McKee.

Ms. Lilly, Manpower Specialist, Environmental Protection Agency, Washington, D.C.

Milton F. Lunch, General Council, National Society of Professional Engineers.

Robert McAnespie, Executive Secretary, Board of Registration for Water Treatment Plant Operations, Division of Water Pollution Control, Senior Sanitary Engineer.

Dan McGillicuddy, DEQE.

Joseph McGinn, Assistant Director, Water Quality Project, MAPC.

John McNeil, President, Liquid Wastes Disposal Association of Massachusetts.

Dr. Herbert Meyer, Mystic River Watershed Association.

Robert H. Murphy, Chairman, Site Evaluation Committee; Town Meeting Member; Member, Planning Board, Town of Wellesley.

Walter Newman, Chief, Water Quality Branch, Environmental Protection Agency, Region I.

Richard Noss, Member, Massachusetts Water Resources Commission; Massachusetts Institute of Technology

Daniel O'Brien, Construction Grants, U.S. Environmental Protection Agency, Region I.

Julia O'Brien, Planner, Metropolitan District Commission; formerly, Chief, Massachusetts Water Supply Policy Study.

Charles Parthum, Senior Vice President, Camp, Dresser, & McKee.

Elaine E. Pickle, Manpower and Training Specialist, U.S. Environmental Protection Agency, Region I.

Lehn Potter, Chief, Municipal Operations Branch, Environmental Protection Agency, Washington, D.C.

Mr. Quinn, Executive Assistant to the Commissioner, Metropolitan District Commission.

Bernard R. Sacks, Chief, Technical Support Section, Permits Branch, U.S. Environmental Protection Agency, Region I.

Mary Shaughnessy, Environmental and Economic Impact Office, U.S. Environmental Protection Agency, Region I.

William Sawyer, Chairperson, 208 APAC.

William Slagel, Head of Enforcement and Permits, Division of Water Pollution Control.

Hjordis Stevens, Practicing Attorney. Appointed by Board of Selectmen of Wellesley to the two site selection committees on Mid-Charles.

Wallace E. Stickney, Director, Environmental and Economic Impact Office; Bill Butler, Section Chief, Massachusetts Planning Section, Water Quality Branch, and Florence Munter, Environmental Protection Specialist, EEIO, Environmental Protection Agency, Region I.

Mark Stoler and Richard Cox, Analysts, Water Quality Project, CMRPC, Worcester, Massachusetts.

Lester Sutton, Director of Water Programs, U.S. Environmental Protection Agency, Region I.

Paul Taurasi, Supervisory Sanitary Engineer, Division of Water Pollution Control; David Standley, Commissioner, DEQE.

Daniel Theriault, Assistant Town Engineer, Town of Canton.

William Thibeault, Executive Secretary to Board of Selectmen, Town of Canton.

George Thompson, Massachusetts Department of Public Works.

Elliott Tucker, Eastern Area Program Manager, Construction Operations Branch, Environmental Protection Agency, Washington, D.C.

Jekabs Vittands, Vice President, Metcalf & Eddy.

Winthrop Wade, Director of Environmental Services, Health Department, City of Quincy.

Martin Weiss, Chief Engineer, Metropolitan District Commission.

APPENDIX B

THE BOSTON CASE STUDY AREA

B.1 The Area

There are almost as many definitions of the Boston Metropolitan Region as there are studies concerned with its regional planning. This appendix describes some of those region definitions, and presents their relationship to wastwater management in the area. Five types of regions are particularly important: those defined by natural conditions, such as river basins; those defined by actual political boundaries; those formed for federal data collection and analysis; those formed for areawide planning, including wastewater planning; and, finally, those used for operating waste management.

1. NATURAL AREAS

For wastewater management, there is only one significant set of natural regions: the river basins in the area. These river basins, as defined by the MAPC,* are shown in Figure B-1. They include tributary streams and, in some cases, are combinations of smaller watersheds--for example, the "SuAsCo" is the drainage basin for the Sudbury, Assabet, and Concord Rivers. The "North Coastal" and "North-South" basins are also aggregations, including all streams draining into the designated areas of coastline. All figures in this section are included as overlays on EMMA area base maps, since that is the largest region so far used for wastewater planning.

2. POLITICAL BOUNDARIES

Figure B-2 shows the study region used for the EMMA project, which included 109 cities and towns. As described below, each of these incorporated entities has its own powers and responsibilities, including portions of the wastewater management responsibilities. They are the basic levels of government for the area, and are also an important source of information.

The figure also shows the EMMA division of communities into Core and Inner and Outer Suburbs. The Office of State Planning has developed a more sophisticated classification, describing as well the other "older cities" (see Figure B-3). Gloucester, for example, has characteristics very different than Stow, so they should be analyzed separately.

The EMMA study region also includes portions of six counties, which are relatively unimportant in Massachusetts: counties in the Commonwealth have few responsibilities aside from the judicial ones.

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*In various studies there is a minor discrepancy in the dividing line between the North-South and Weymouth Basins.

Figure B-1

River Basins in the Study Area

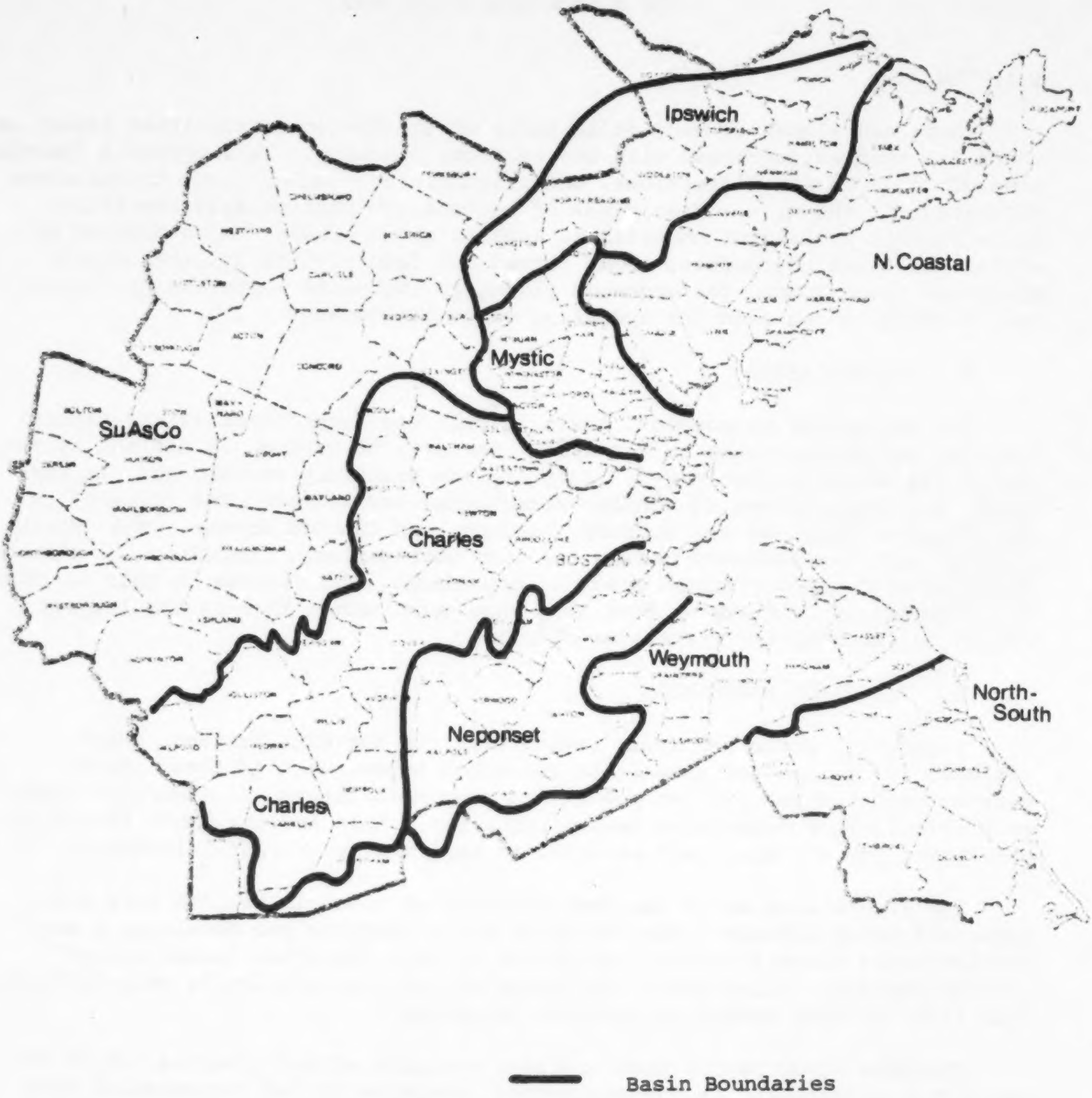
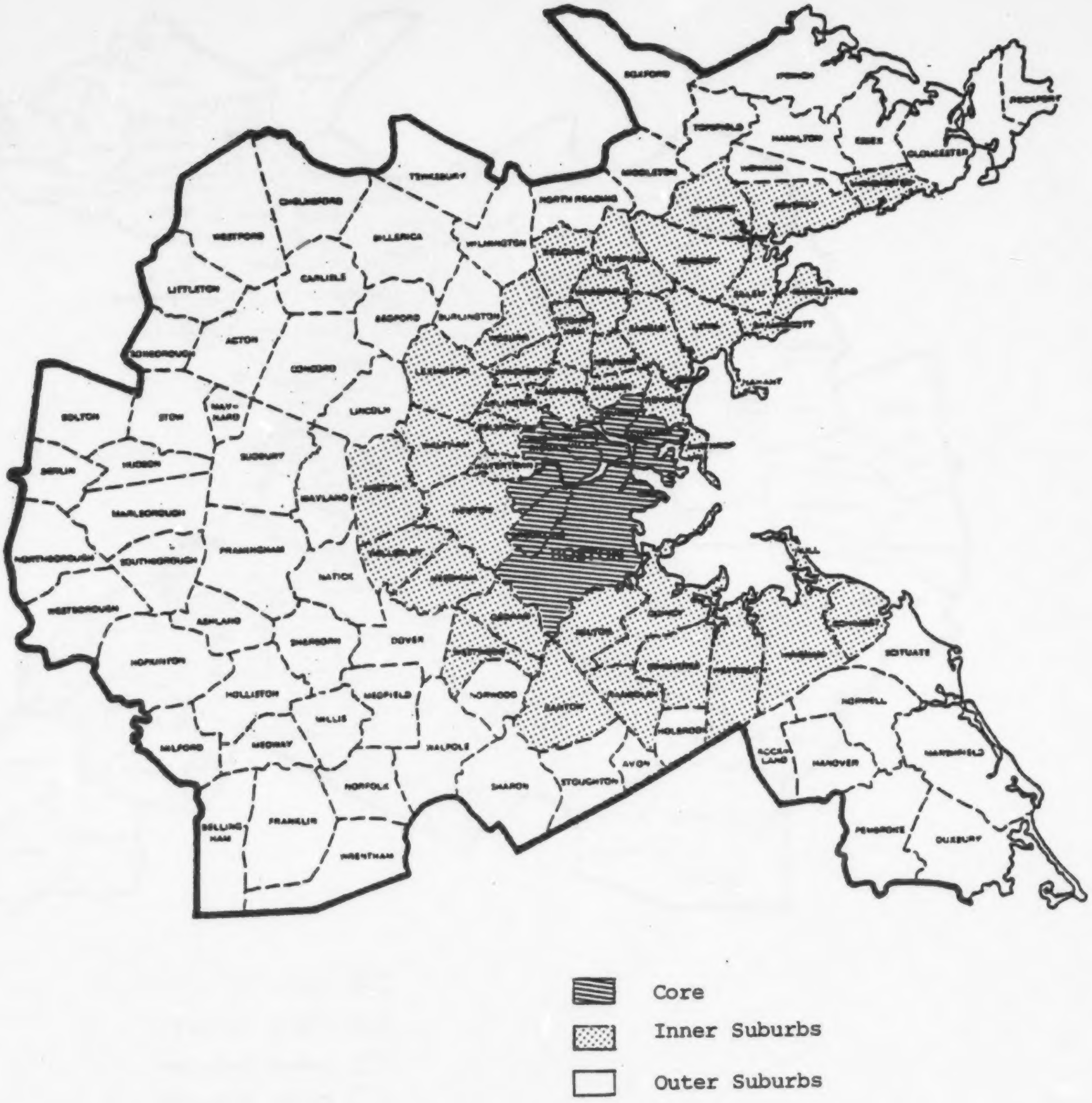

Ipswich
N.Coastal
Mystic
SuAsCo
Charles
BOSTON
Weymouth
North-South
Neponset
Charles
Basin Boundaries

Figure B-2

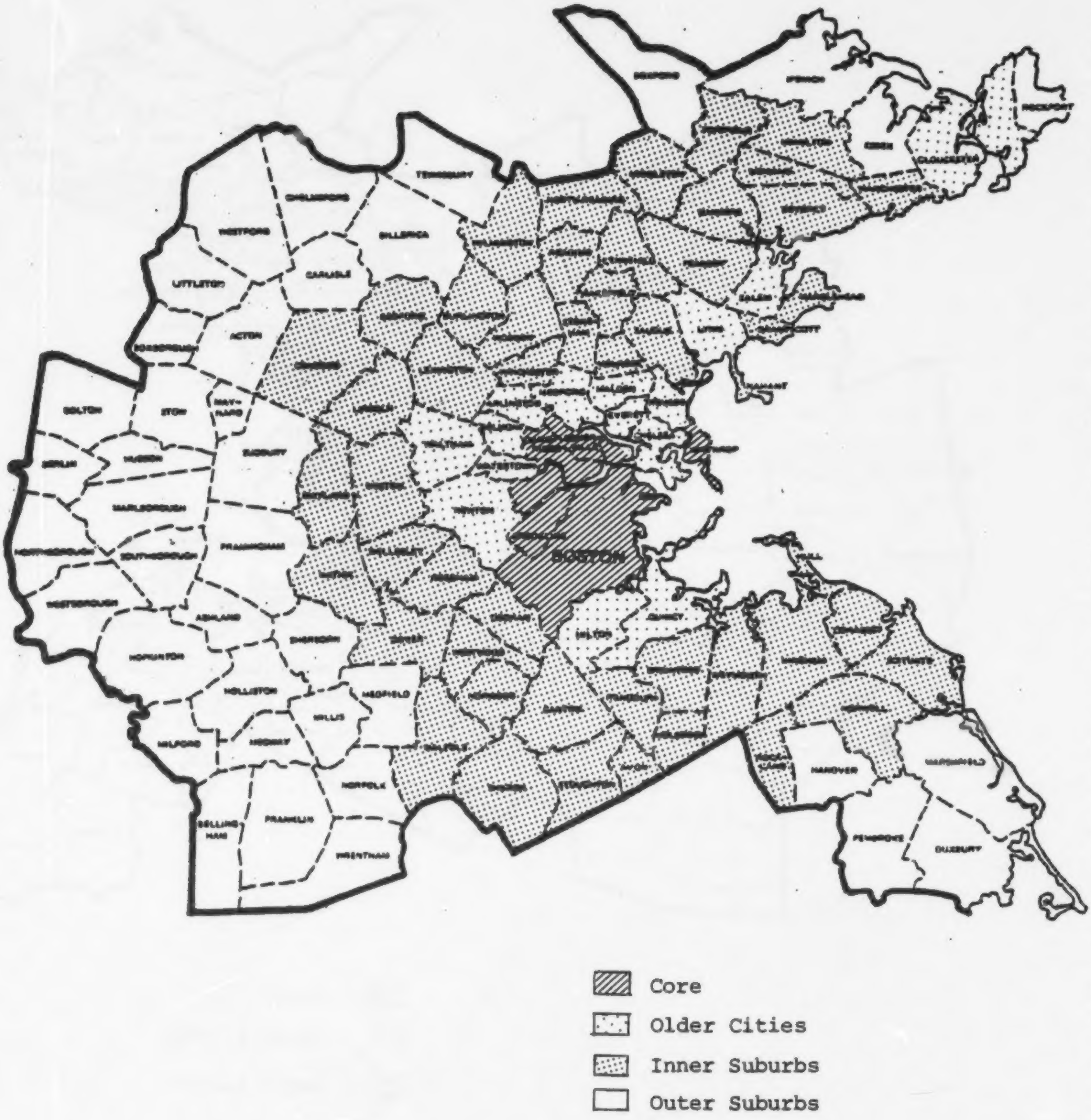
EMMA Classification of Communities



SEAFORD
IPSWICH
ROCKPORT
TOPSFIELD
HAMILTON
ESSEX
GLOUCESTER
MIDDLETON
TEWKSBURY
NORTH READING
CHELMSFORD
WESTFORD
BILLERICA
WILMINGTON
CARLISLE
LITTLETON
BEDFORD
BURLINGTON
ACTON
BOXBOROUGH
CONCORD
BOLTON
STOW
MAYNARD
LINCOLN
LEXINGTON
WOBURN
LYNN
SWAMPSCOTT
NAHANT
BERLIN
HUDSON
SUDBURY
MARLBOROUGH
WAYLAND
WESTON
NEWTON
WALTHAM
WATERTOWN
BOSTON
FRAMINGHAM
NORTHBOROUGH
SOUTHBOROUGH
NATICK
WELLESLEY
NEEDHAM
WESTBOROUGH
ASHLAND
SHERBORN
DOVER
DEDHAM
MILTON
QUINCY
HOPKINTON
WESTWOOD
HOLLISTON
MEDFIELD
NORWOOD
CANTON
RANDOLPH
HOLBROOK
WEYMOUTH
HINGHAM
COHASSET
SCITUATE
NORWELL
MILFORD
MEDWAY
MILLIS
WALPOLE
ROCKLAND
HANOVER
MARSHFIELD
NORFOLK
SHARON
STOUGHTON
AVON
BELLINGHAM
FRANKLIN
WRENTHAM
PEMBROKE
DUXBURY
HULL
Core
Inner Suburbs
Outer Suburbs

Figure B-3

Office of State Planning Community Classification


TEWKSBURY
CHELMSFORD
WESTFORD
BILLERICA
CARLISLE
LITTLETON
ACTON
BOXBOROUGH
BOLTON
STOW
MAYNARD
SUDBURY
BERLIN
HUDSON
MARLBOROUGH
NORTHBOROUGH
SOUTHBOROUGH
FRAMINGHAM
WESTBOROUGH
ASHLAND
SHERBORN
HOPKINTON
HOLLISTON
MEDFIELD
MILLIS
MILFORD
MEDWAY
NORFOLK
BELLINGHAM
FRANKLIN
WRENTHAM
LEXINGTON
LINCOLN
WALTHAM
WATERTOWN
NEWTON
NATICK
IPSWICH
ROCKPORT
ESSEX
GLOUCESTER
SALEM
MARBLEHEAD
SWAMPSCOTT
LYNN
NAHANT
MALDEN
EVERETT
CHELSEA
BOSTON
HULL
QUINCY
MILTON
COHASSET
SCITUATE
HANOVER
MARSHFIELD
PEMBROKE
DUXBURY
Core
Older Cities
Inner Suburbs
Outer Suburbs

3. FEDERAL DATA COLLECTION AND ANALYSIS AREAS

One of the most useful sources of general data about an area in the U.S. Census, and the census areas are, therefore, important. Detailed data are available for most of the region by tract, but the aggregate areas are more significant for wastewater management planning. Two types of aggregations are particularly important: the Urbanized Area, and the Standard Metropolitan Statistical Areas (SMSA). These two census areas are shown in Figure B-4. In most areas of the country, the SMSA is formed from counties; however, the importance of cities and towns referred to above has led the census to define New England SMSAs according to town boundaries. In addition, almost all the towns in the region qualify for census tabulation as minor civil divisions with populations over 2,500.

4. AREAWIDE PLANNING REGIONS

Most of the significant regions developed in past studies have been formed for areawide planning. The largest have been developed for transportation planning and population projections, including the "Eastern Massachusetts Regional Planning Project" area, and the "Eastern Massachusetts Macro Metropolitan Region," both of which include not only the Boston SMSA, but also the Lawrence-Haverhill area, the Lowell area, and the Brockton area. A similar large region is suggested by Rand McNally as their metropolitan area, based on the concept of commercial trading centers.

The "Southeast New England Water and Related Land Resources Study." (SENE) performed by the New England River Basins Commission, including the Southeast portions of the study region, along with most of Rhode Island, Cape Cod and the Islands. This study based its approach on areawide land use capability mapping.

Of more localized studies, the "Eastern Massachusetts Metropolitan Area" of EMMA study is the largest. The EMMA study area was developed by taking the base area served by the MAPC, and adding communities to complete river basins, particularly in the west and northwest sections of the region.

Figure B-5 shows the region used by MAPC in its 208 project. This is a slight reduction in the basic MAPC region, caused by the way 208 agencies were assigned. A State task force was given the responsibility for forming the 208 regions, and it assigned areas based on their representation in 1970 SMSAs and their perceived water quality problems. Several communities which would generally have been part of MAPC projects were omitted. Since the EPA decision requiring that states provide 208 planning for the "balance of the state," a State 208 program has been developed to include these communities, but much of the operational 208 planning for them will be performed with MAPC assistance. The communities are listed in Table B-6 are those in the MAPC area, but not in the 208 project region. This allocation decision significantly reduces the transferrability of data across projects.

Figure B-4

Census Area Definitions

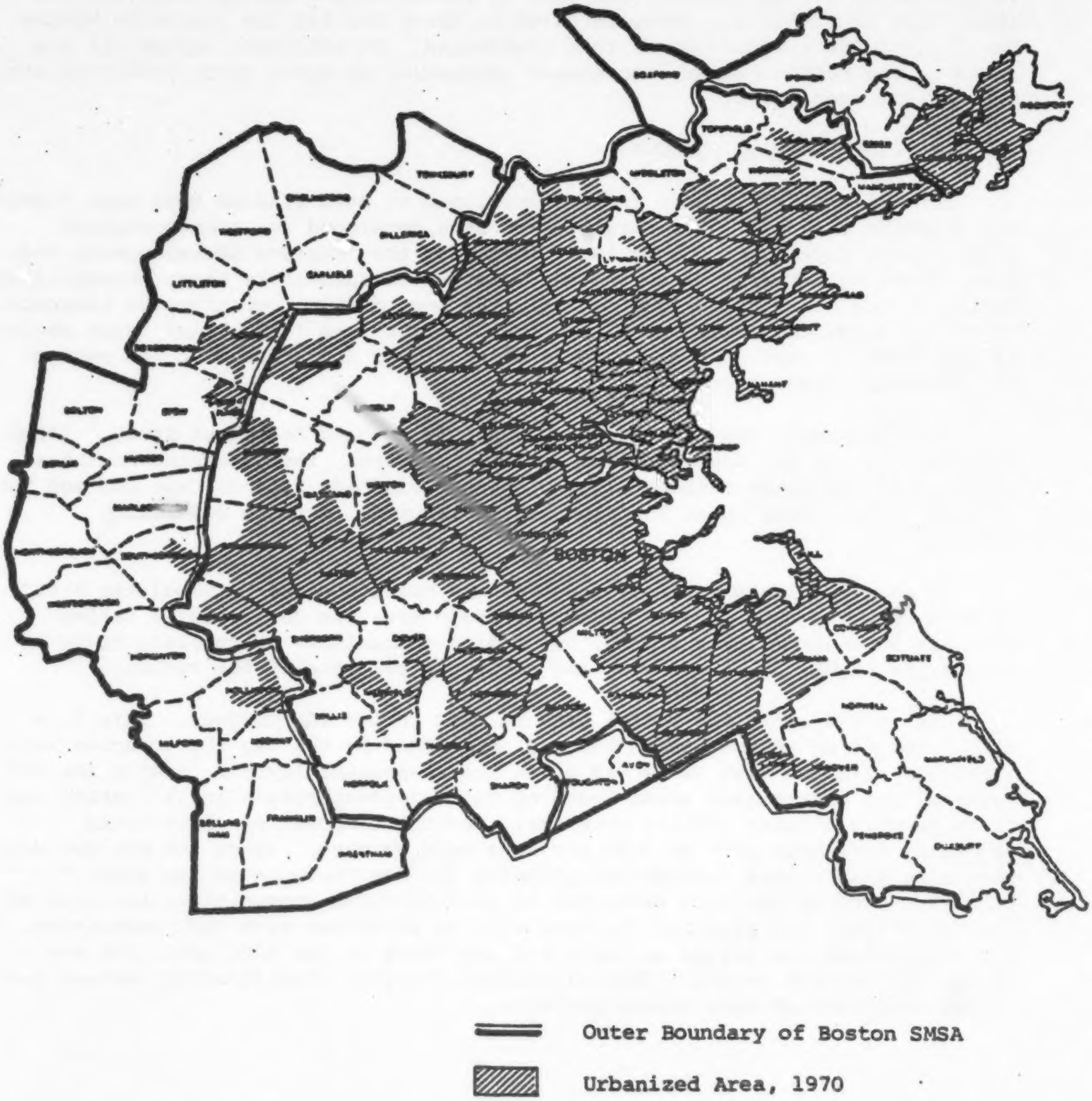
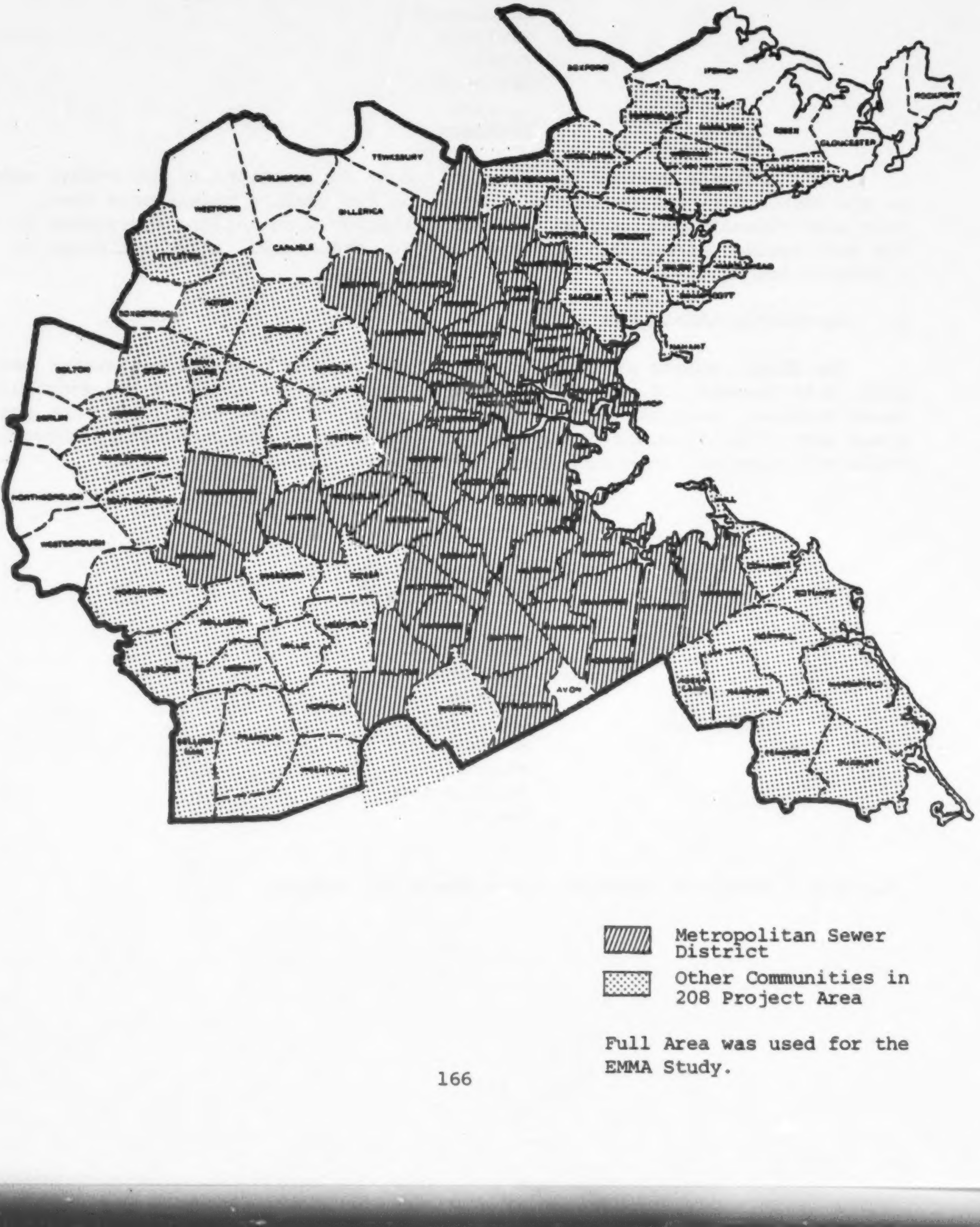

SEAFORD
TOPSFIELD
ESSEX
ROCKPORT
MIDDLETON
MANCHESTER
TEWKSBURY
CHELMSFORD
WESTFORD
BILLERICA
LITTLETON
CARLISLE
LYNNFIELD
NAHANT
BOLTON
BOSTON
HOPKINTON
MILFORD
NORFOLK
FRANKLIN
BELLINGHAM
WRENTHAM
SHARON
AVON
SCITUATE
NORWELL
HANOVER
MARSHFIELD
PEMBROKE
DUXBURY
Outer Boundary of Boston SMSA
Urbanized Area, 1970

Figure B-5

Wastewater Management Areas


BOXFORD
IPSWICH
ROCKPORT
ESSEX
GLOUCESTER
TEWKSBURY
CHELMSFORD
WESTFORD
BILLERICA
CARLISLE
LITTLETON
BOLTON
BERLIN
NORTHBOROUGH
WESTBOROUGH
BOSTON
NAHANT
AVON
▨ Metropolitan Sewer District
░ Other Communities in 208 Project Area

Full Area was used for the EMMA Study.

Table B-6

Communities in MAPC, Not Represented in 208 Project

Bolton
Boxborough
Carlisle
Essex
Gloucester
Ipswich
Rockport

Other areawide regions may be significant for portions of the study, such as the Boston Air Quality Control Region and Air Quality Maintenance Area. Most park planning and some of the transportation planning are aggregated to the MAPC region, and almost all base data are compatible, being estimated on a town-by-town basis.

5. WASTEWATER MANAGEMENT REGIONS

The final regions of interest are those actually used for wastewater management, both present and proposed. The most important of these is the Metropolitan Sewer District, part of the MDC, which is shown in Figure B-5. Under the proposed EMMA plan, it would be expanded to also include the communities shown in Table B-7; however, this much expansion appears unlikely.

Table B-7

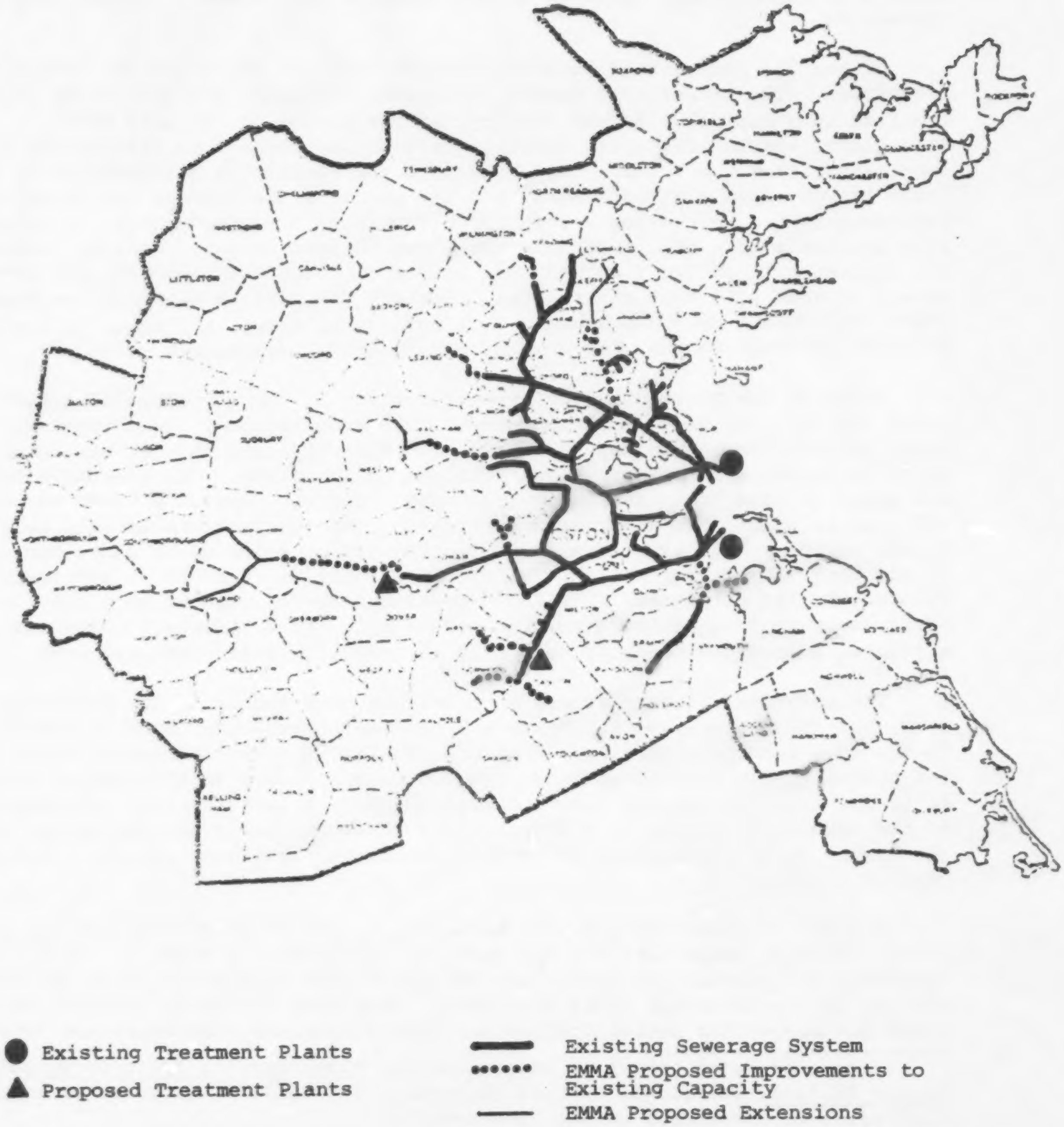
Communities Proposed For Inclusion in MSD

Dover
Hopkinton
Lincoln
Lynnfield
Sherbon
Sharon
Southborough
Weston

Figure B-8 shows the existing and proposed MDC systems.

Figure B-8

Existing and Proposed MDC System


● Existing Treatment Plants
▲ Proposed Treatment Plants
Existing Sewerage System
EMMA Proposed Improvements to Existing Capacity
EMMA Proposed Extensions

B.2 Local Government

There are 351 cities and towns, units of local government, in Massachusetts.* Towns may appropriate money for water and sewers, form conservation commissions, exercise zoning and subdivision control requirements (including flood plain and other environmental forms of zoning), and lay out sewerage systems. While a formal home-rule amendment was not passed until 1966, there has been a tradition of local control, and strong local governments. Thus, it is important to look at the powers and organizations of these cities and towns since they can have an impact on sewer planning, particularly through interlocal agreements.

Of the 351 communities in Massachusetts, 312 are towns and only thirty-nine are cities. The cities have mayors, managers, councils, and government structures familiar in other parts of the country. Three cities in the area have significant special features: Cambridge elects its council by "Proportional Representation," where each voter rates all the candidates preferentially; this leads to very open election races, and may increase the breadth of community representation. Newton has a very large "Board of Aldermen" which, in effect, acts similarly to a representative town meeting (see below). Finally, Boston, the largest city in the state and the seat of the state government, has lower levels of home rule that other areas. Besides the various Metropolitan agencies (MAPC, MDC, MBTA, the Massachusetts Port Authority, etc.), the state is involved in other controls over city operations and financial management.

Towns in New England occupy a special place in the governmental structure, being run by a unique form of government, the town meeting. Town meetings in their purest form give citizens of the town the responsibility of making all major decisions (zoning, etc.) and voting on all budgets. The executive body, the Board of Selectmen, and other appointed officials compile a "Town Warrant" for discussion and voting at town meetings. Town meetings are usually held in the early spring, with supplementary sessions as required at other times of the year. In larger communities (6,000 population or more), a Representative Town Meeting is permitted, with "Town Meeting Members" elected on a precinct basis; most representative town meetings have 200 to 400 members. Any citizen may speak at the town meeting, but only elected representatives may vote.

The town meeting form attempts to include more people in the political process, but it has some costs. Since all capital expenditures must be submitted to the town meeting, there is a tendency for long approval delays to occur in the process. The town meeting can also be fairly immune to enforcement actions; it is difficult to require that a community build a facility when all members of the community, acting in a body, refuse to either build the facilities or pay the fine. While enforcement can still take place, the towns are in a strong bargaining position.

Besides the town meeting, the towns have a number of elected and appointed committees with responsibility for specific functions. A number of towns have revised their charters to have "Town Managers" with responsibilities and duties similar to city managers found elsewhere. Most have "planning boards," responsible for suggesting zoning changes and approving plans; variances are voted on by a "Board of Appeals," and both these bodies are usually elected. Some towns have "sewer committees." The town governmental structures also include "conservation commissions," which are responsible for open space preservation, some historical preservation, and wetlands control under the Massachusetts Hatch Act.

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*League of Women Voters of Massachusetts, Massachusetts State Government Second Edition, Cambridge: Harvard University Press, 1970, gives an extensive discussion of government in the Commonwealth.

The cities and towns form most of the grantees under P.L. 92-500, and are authorized by Chapter 83 of the General Laws to construct the necessary facilities. Many of the cities and towns also provide public water supplies, which require wells, treatment plants, or protected water supply reservoirs.

B.3 Regional Agencies

The constitution of the Commonwealth reserves the power to authorize multi-town regional authorities for the General Court. Massachusetts has generally taken a permissive approach toward authorizing special district or joint projects if all the participating towns are in agreement. A special act of the legislature is generally required, but historically has not been difficult to obtain.

For wastewater management, the procedures are substantially eased by the 1967 Massachusetts Clean Waters Act (General Laws, Chapter 21, Sections 26-33) which permits the formation of water pollution abatement districts without special legislation. The districts are composed of more than one city or town and are governed by a commission representing each of the cities or towns involved. Each district is granted extensive powers covering financing, contracting, owning property, and operating treatment plants. In general, however, the districts are only wholesalers to the towns without the authority to levy fees directly on individuals. These agencies have adequate authority to be eligible for 92-500 grant assistance.

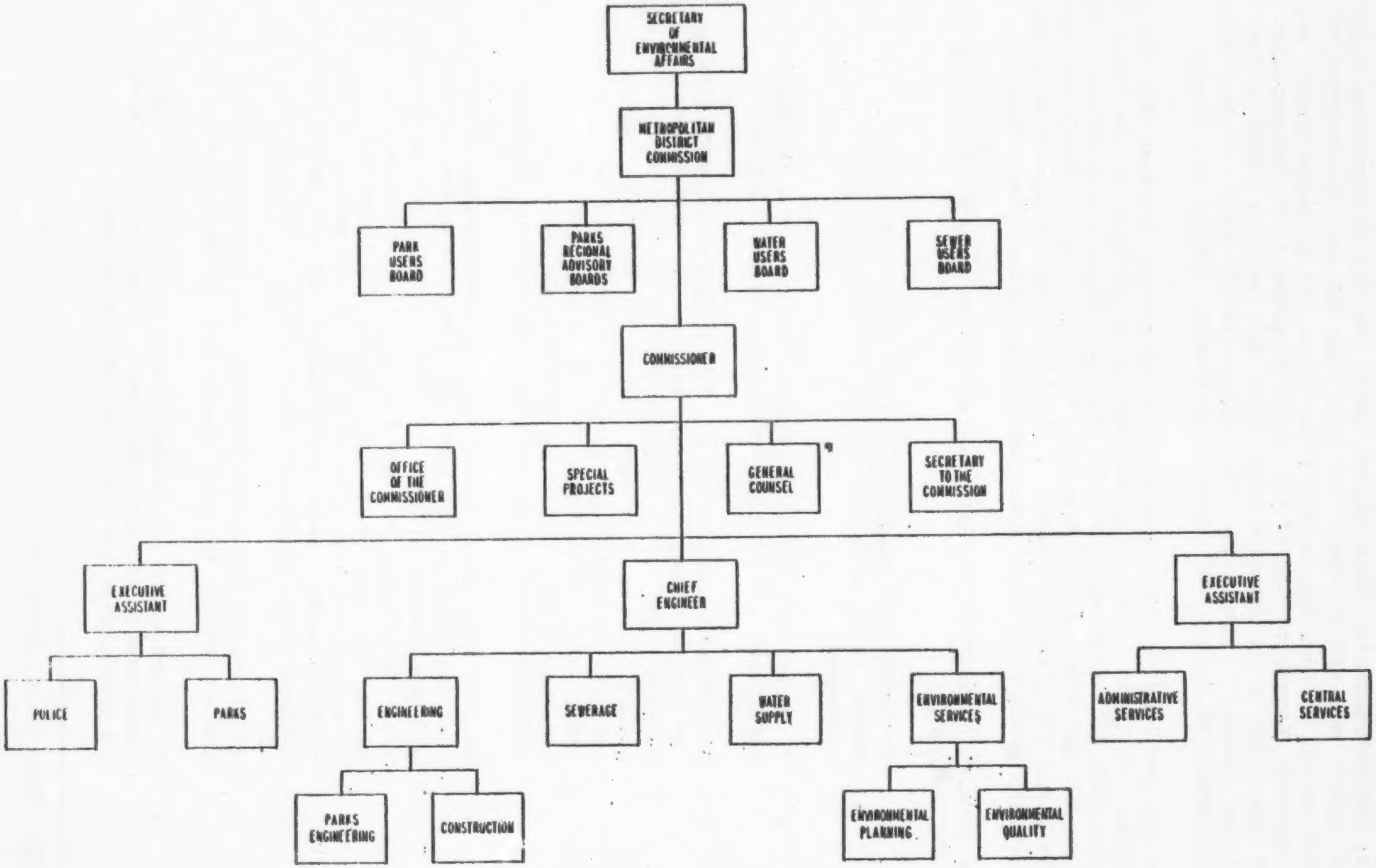
Since 1967, the Commonwealth has authorized contractual obligations between towns for water pollution abatement, offering another form of regionalization that is less cumbersome than special districts. Lynn, Nahant and Saugus are planning to use this technique for jointly treating their wastes at the proposed 200 MGD Lynn treatment plant. A Step 2 grant for this project is on the Massachusetts FY76 priority list, but there is some disagreement over the necessity of secondary treatment for the proposed ocean outfall. Several towns in the periphery of the Study Area have considered this method of organizing for regional treatment as well.

Three regional sewer agencies are operating in the Study Area at this time. The Metropolitan Sewer District (MSD) of the Metropolitan District Commission (MDC) is the largest, serving over two million people in 1970 or slightly over two-thirds of the area's population. The MDC is actually a state agency within EOEA, but was established solely to serve its member communities who finance its operations. It is headed by a commissioner and four associate commissioners and operates under the authority of Chapters 28 and 29 plus applicable sections of Chapter 92 of the General Laws, and from Chapter 705 of the Acts of 1945 which establish rules and regulations for discharge of sewage and industrial wastes. Figure B-9 shows the organizational structure of the MDC. The MDC is responsible for supplying major sewer facilities, water, and parks and recreation to the fifty-four cities and towns that are members of one or more of the districts. There are forty-three members of the Metropolitan Sewer District, thirty-four communities in the Metropolitan Water District, and thirty-seven communities in the Parks. In addition, the MDC operates the third largest police force in New England to provide security for the park system and certain parkways.

The great-grandfather of the MDC was the first legally constituted metropolitan district in the United States. The Metropolitan Sewerage District (MSD) was established by the Commonwealth in 1889 to provide sewerage facilities for Boston and the surrounding communities. At roughly the same time, two other

Figure B-9

Metropolitan District Commission


SECRETARY OF ENVIRONMENTAL AFFAIRS
METROPOLITAN DISTRICT COMMISSION
PARK USERS BOARD
PARKS REGIONAL ADVISORY BOARDS
WATER USERS BOARD
SEWER USERS BOARD
COMMISSIONER
OFFICE OF THE COMMISSIONER
SPECIAL PROJECTS
GENERAL COUNSEL
SECRETARY TO THE COMMISSION
EXECUTIVE ASSISTANT
CHIEF ENGINEER
EXECUTIVE ASSISTANT
POLICE
PARKS
ENGINEERING
SEWERAGE
WATER SUPPLY
ENVIRONMENTAL SERVICES
ADMINISTRATIVE SERVICES
CENTRAL SERVICES
PARKS ENGINEERING
CONSTRUCTION
ENVIRONMENTAL PLANNING
ENVIRONMENTAL QUALITY

SOURCE: EMMA, Financing and Management, Vol. 12, p. II-8.

agencies, the Metropolitan Water Board (1895) and the Metropolitan Parks District (1893) were established. In 1901, the MSD and the Metropolitan Water Board were merged to form the Metropolitan Water and Sewerage Board, and in 1919 in another reorganization of the state government the Metropolitan Park District was added to the Metropolitan Water and Sewerage Board to form the Metropolitan District Commission. Throughout all of these reorganizations, the basic separation of powers has remained as sewers, parks, and waters.

The MDC overlaps in jurisdiction with the state, counties and the local governments. While it is the only wholesaler of services in the area, it must coordinate with these jurisdictions in terms of facilities planning. The overlap of the MDC and the Metropolitan Area Planning Council (MAPC, see Section I.3 below), and the planning boards of the individual communities is significant in the overall pattern of wastewater management in the Commonwealth.

The general powers* of the MDC related to the Metropolitan Sewer District are the following:

- To acquire by purchase, eminent domain or other means, land, watersources, rights-of-way, or easements.
- To construct, control, operate, and maintain sewerage facilities for the Metropolitan Sewerage District.
- To order the removal of all sewage and pollutants from the Charles River and Basin and its tributaries below Waltham. MDC reserves the authority to approve all sewers, drains, or other outlets for drainage, substances, or wastes (including septage) into any sewer under its control, or any sewer tributary thereto, within the north metropolitan sewerage district or the south metropolitan sewerage district.
- To levy additional assessments or assessments to communities whose sewage does not comply with the rules and regulations of MDC, provided that no such additional assessment shall be levied on any such municipality in any one year which shall exceed the lesser of an amount equal to one-twentieth of one percent of the taxable value of such municipality, or the sum of two hundred thousand dollars ($200,000).
- To establish direction, control, and regulation over the connection to local sewers and its main sewers.
- To apportion to the member cities and towns the cash requirements for the retirement of debt and the costs of maintenance and operation of the system.

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*EMMA, Vol. 12, p. 2-13, 15.

- To sell property, real or personal, no longer needed in performing sewage treatment functions.
- To contract with any city or town for extension of sewage disposal system and for reception and disposal of the sewage therefrom.
- To contract with any city or town for admission to the sewerage district.
- To hold public hearings and issue annual reports to the members.

The MDC was the lead agency in the recent Wastewater Management and Engineering Plan for Boston Harbor Eastern Massachusetts Metropolitan Area which is referred to throughout this report as EMMA.

The second regional sewer agency currently operating in the area is the South Essex Sewer District (SESD) serving about 153,000 people (1970) in the communities of Salem, Peabody, Beverly, Danvers, Marblehead, part of Middleton (Ferncroft Village), three state and county institutions and Gordon College in Wenham (connecting to the Beverly system). The District was established in 1925 by Chapter 339 of the Acts of that year, and its authority and geographic extent subsequently has been amended a number of times.* The principal activity of the SESD has been the maintenance of an interceptor and outfall serving the member communities, but they are currently constructing a primary treatment plant in Salem with the assistance of grants from EPA and the Commonwealth. Upgrading to secondary treatment is under discussion but no firm plans have been made.

The District is empowered to issue general obligation debt, carrying a Moody's Rating of A-1 in 1974. Operating and debt service costs are repayed through assessments of the member communities. The District is currently developing user charge and industrial cost recovery systems for use by the member communities. Because the SESD is not empowered to collect fees directly from customers, enforcement of these provisions appears to be a matter between the local communities and the EPA. At present, Peabody and Danvers have sewer use charges; in both towns it is based on a water use surcharge. The District has a sewer use ordinance, and all the member communities have enacted sewer ordinances at least as strict as the District's.

Under the provisions of Chapter 21, discussed above, the Charles River Pollution Control District (CRPCD) was established in 1973. The District currently includes Medway and Franklin, but other towns including Holliston, Wrentham, the northern part of Bellingham, and part of Millis may be included in the system. It is likely that these towns will contract with the District rather than become formal members of the legal entity. A 4.5 MGD AWT plant was designed by Camp, Dresser & McKee, Inc. is under construction. Of the 4.5 MGD treatment capacity, 2.3 MGD will be initially required for Franklin and Medway. Local capital for the system was provided through serial general obligation bonds. At present, both Franklin and Medway provide metered town water, and water surcharges for sewers are currently in use. Except for the MSD, none of the regional sewer agencies discussed in this section were examined in detail.

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*For a complete listing, see pages 161-171 of Massachusetts General Laws Relating to Water and Water Rights, by the Massachusetts Water Resources Commission, Boston, Massachusetts, 1970.

METROPOLITAN AREA PLANNING COUNCIL

One of thirteen Regional Planning Authorities(RPA) in the Commonwealth, the Metropolitan Area Planning Council (MAPC) was created in 1963 as an agency for planning regional solutions to a wide variety of problems in the Boston Metropolitan Area. The MAPC started with a membership of forty-seven communities, and has grown to include 101. It is governed by a council including representatives from each community, along with members appointed by the governor and local, regional, and State agency heads.* Most of the primary decision-making is done by a twenty-four member executive committee and the executive director.

Although the RPAs are statutorily based, they have no specific implementation power, and only advise the member communities. In 1967, the MAPC received the regional A-95 review powers. The MAPC has been responsible for regional population and activity projections for other regional studies and has prepared comprehensive plans in the areas of recreation, housing, urban services, emergency services, water and wastewater management, and transportation. Much of its work has been funded through 701 grants. Other sources of funding include EPA and UMTA grants, assessments on the member communities, and contracts with various state and local agencies.

One of the areas where the MAPC has been most active is in transportation planning. It was the "3C" transportation agency, based on federal requirements for "comprehensive, cooperative, and coordinated" transportation planning in SMSAs. Currently it houses the Central Transportation Planning Staff (CTPS). The CTPS is an attempt to coordinate all transportation planning for the area under one agency. It is supported by the MAPC, the State Department of Public

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*The Ex-Officio Agency members in MAPC include:

Boston Department of Public Works
Boston Redevelopment Authority
Department of Environmental Management
Massachusetts Bay Transit Authority
Department of Commerce and Development
Department of Public Safety
Department of Public Works
Massachusetts Port Authority
Metropolitan District Commission, and
Executive Office of Communities and Development.

Some of these have a role in wastewater planning and are discussed further elsewhere in the report. MAPC, Regionalism in Action: Annual Report, Boston, 1976.

Works, the State Secretary of Transportation, the Massachusetts Bay Transit Authority (MBTA) and others. The CTPS is a continuation of the Boston Transportation Review (BTPR), a major project completed in 1973 which resulted in a shift of funds from highways to mass transit projects.

The MAPC has been designated as the regional 208, or Areawide Waste Water Management, agency, and received its grant of $2.29 million in June 1975. Like other 208 agencies, its concern has been with both point and non-point pollution sources, and with both structural and non-structural controls. The MAPC was also a member of the EMMA technical subcommittee, but had no direct responsibility for performing the research. The 208 project is separated from the rest of the agency and housed in another building.

B.4 State Agencies

Three relatively distinct portions of the legislative and administrative structure of the Commonwealth of Massachusetts are involved in environmental planning. These are the Executive Office of Environmental Affairs (EOEA) and four of its divisions, the Office of State Planning (OSP) and the General Court (Legislature) of the Commonwealth.

Executive Office of Environmental Affairs

The Executive Office of Environmental Affairs (EOEA) is the primary environmental planning and regulatory agency within the state. It was formed in the reorganization of the executive branch which occured in 1975 and contains all of the former Department of Natural Resources plus the environmental regulation divisions of Public Health and to a lesser degree other state agencies. Figure B-10, the EOEA organization chart, shows the departments and divisions existing in 1977.

The major departments involved in water pollution control, environmental planning and regulation, are the Department of Environmental Quality Engineering (DEQE), the Office of Coastal Zone Management (OCZM), the Environmental Impact Review Office (responsible for the Massachusetts Environmental Policy Act, MEPA), and the Metropolitan District Commission (MDC).

Department of Environmental Quality Engineering

The Department of Environmental Quality Engineering (DEQE) within EOEA is the major regulatory agency within the state. Its commissioner is required to sign every permit issued by the Department. It is estaimated that over half of all the permits issued by the State are issued by DEQE. This frequently means that the Commissioner must sign as many as a dozen or more permits required for a specific construction project ranging from NPDES permits to outdoor advertising.

These cumbersome departmental procedures offered much of the impetus for the development of an Environmental Engineering Directory released during fall of 1976 in draft form. The Directory outlines, by department, all permits issued within DEQE. It also describes DEQE's reorganization into regions, and changes in the permit process:

> "Under the new decentralized system a Regional Environmental Engineer (REE) will coordinate all DEQE reviews for a region. The regions will serve as mini-DEQE departments. Each region has one Regional Environmental Engineer as chief administrator, as well as an engineering and administrative staff (see Appendix A for REE names and addresses). Regional Environmental Engineers will be directly responsible for enforcement, plan and project review, and granting Environmental Authorizations.

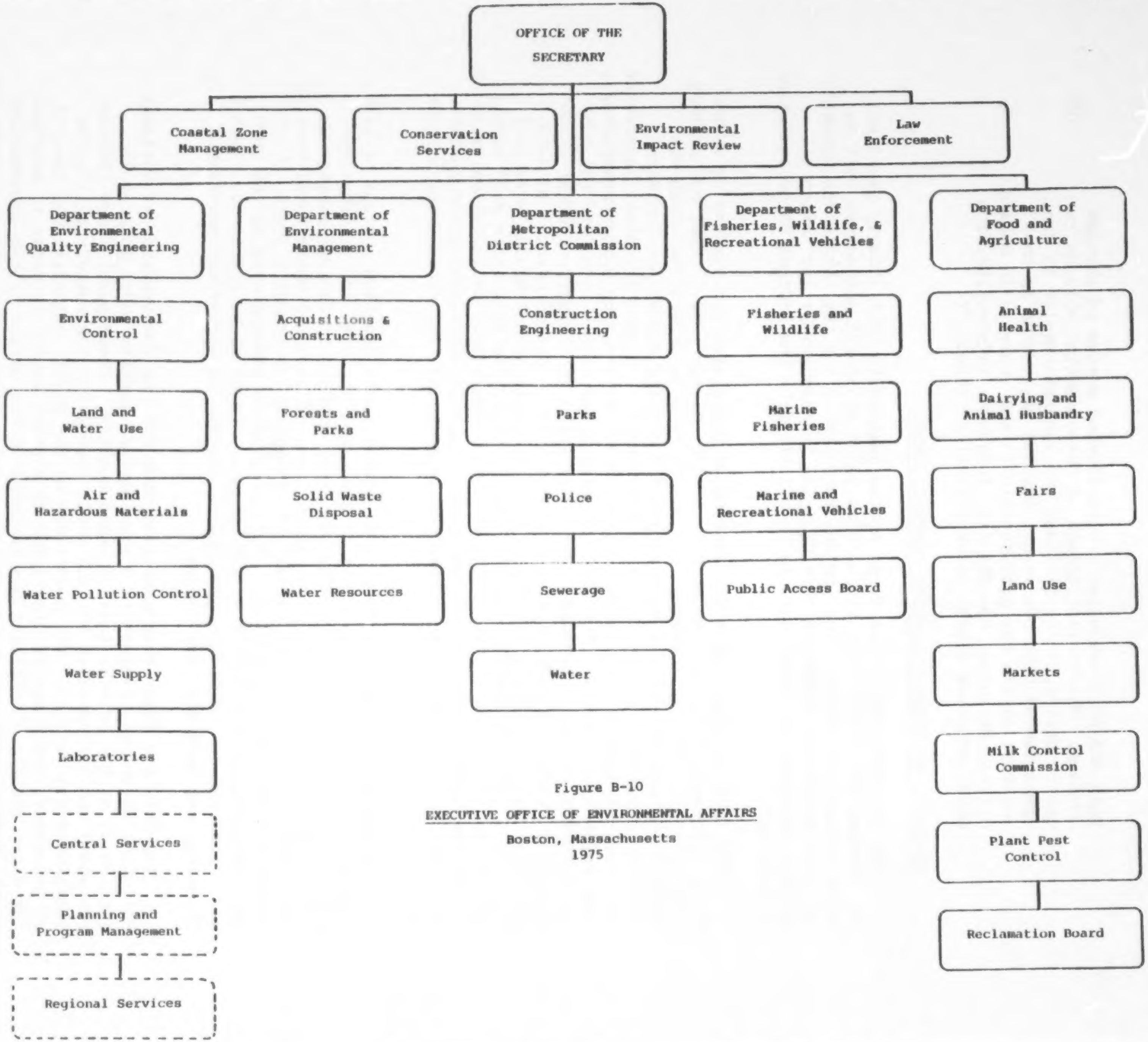
OFFICE OF THE SECRETARY
Coastal Zone Management
Conservation Services
Environmental Impact Review
Law Enforcement
Department of Environmental Quality Engineering
Environmental Control
Land and Water Use
Air and Hazardous Materials
Water Pollution Control
Water Supply
Laboratories
Central Services
Planning and Program Management
Regional Services
Department of Environmental Management
Acquisitions & Construction
Forests and Parks
Solid Waste Disposal
Water Resources
Department of Metropolitan District Commission
Construction Engineering
Parks
Police
Sewerage
Water
Department of Fisheries, Wildlife, & Recreational Vehicles
Fisheries and Wildlife
Marine Fisheries
Marine and Recreational Vehicles
Public Access Board
Department of Food and Agriculture
Animal Health
Dairying and Animal Husbandry
Fairs
Land Use
Markets
Milk Control Commission
Plant Pest Control
Reclamation Board

Figure B-10

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

Boston, Massachusetts
1975

> Each REE will establish a consolidated system of program reviews. The overall effect of consolidation will be to reduce delays, uncertainties, and inconsistencies in the operation of DEQE programs. The RRE will serve as the contract person for projects within the region. In making a final decision, the REE will integrate information from DEQE programs except Water Pollution Control."*

Division of Water Pollution control (DWPC)

The Massachusetts Clean Water Act as amended in 1975 closely parallels the federal act except that it includes major non-point sources as well as point source pollutants. The implementing agency for the Act is the Division of Water Pollution Control within DEQE who is responsible for taking all actions required for Massachusetts to benefit from the Federal Water Pollution Control Act.

The DWPC is responsible for setting of priorities for funding of wastewater treatment facilities under P.L. 92-500 (Section 106). They had primary responsibility for the statement of general funding priorities which was approved by EPA and now are responsible for setting guidelines for more specific priority lists on a year by year basis. In general, these priorities call for the funding of treatment plants first followed by major interceptors, then collection systems. The DWPC has maintained nearly total control over the priority listing procedure despite agitation on the part of other state agencies, notably the OSP, for an official role in this process. As such, the DWOC has a relatively large impact on planning of wastewater treatment facilities, with OSP being consulted only in its role as a state A-95 agency and the Environmental Review Center able to comment only on individual aspects of any treatment facility or interceptor requiring additional state permits as 92-500 projects have been categorically excluded from consideration under MEPA.

Massachusetts (Chapter 21 of the General Laws) provided a grant of fifteen percent of the eligible costs of a project approved for seventy-five percent funding under P.L. 92-500, and other funding if federal support is unavailable (ninety percent of eligible costs of projects whose total cost is less than $5 million, seven percent of estimated construction costs is advanced for facilities planning). This program is administered by the DWPC. The Commonwealth also certifies qualified treatment plant operators. Other state programs and permitting procedures impinge on wastewater management planning, and were discussed above.

The DWPC has joint responsibility with EPA for the issuance of National Pollutant Discharge Elimination System (NPDES) permits under Chapter 21, Section 43 of the General Laws of Massachusetts. These permits are jointly processed and evaluated by EPA and DWPC, though EPA has responsibility for administrative details. The conditions of the permit establish the quality of pollutants which may be discharged by a point source in order to maintain the water quality classifications assigned to the waters of the Commonwealth or the Federal effluent standards assigned to a particular category of sources.

The permits place responsibility for monitoring and reporting of discharges on the discharger. DWPC is the only part of the Department which has not yet been regionalized.

In addition to the NPDES permits, DWPC issues permits for extension and/or connection to sanitary sewers. This permit covers additions to flows to current systems in excess of 2000 gallons per day, or may be required for any connection in communities so notified by DWPC or for any industrial wastes to be added to an existing waste system.

The DWPC working in cooperation with the Division of Land and Water Use issues permits for "hazardous wastes" entering landfills, such as sewage sludge not fulfilling the requirements of Chapter 111, Section 150a. The DWPC and GEC work closely on permitting procedures for large scale (over 2000 gallons/day) subsurface wastewater disposal (Chapter 111, Section A), and on the permitting procedures for sanitary landfills when the leachate from such facilities may enter either surface or groundwater. In addition, DWPC under Chapter 21, Section 43, is responsible for the issuance of permits covering any discharges over 15,000 gallons per day not covered by the NPDES permitting procedure. DWPC issues permits for state water quality certification required for the conduct of any activity which may result in any discharge into navigable waters. This permit is required prior to any construction in waters of the state. Other permits issued include those for industrial waste treatment facilities, marine oil terminals, and hazardous wastes as discussed under sludge disposal above.

Division of Land and Water Use (DLWU)

The Division of Land and Water Use is responsible for a wide variety of permits ranging from requirements for sanitary landfills to outdoor advertising. Their principal responsibilities related to water pollution control are in the areas of subsurface wastewater disposal and landfilling of sewage sludge and septage wastes.

Under Chapter 111, Section 17, GEC must approve all subsurface sewage disposal systems with volumes greater than 2000 gallons per day and all industrial waste facilities discharging into the ground. This regulation covers major public facilities within the Commonwealth such as schools and hospitals not connected to municipal sewage treatment facilities as well as private developments such as apartment complexes, condominiums and industrial plants providing sanitary facilities for employees. It should be noted here that in many states, facilities of this size would be considered "package" treatment plants. This generic type if not found in Massachusetts because regulations, principally those concerned with the settling tanks, prevent the installation of systems which may be purchased "off of the shelf." In addition, there is no provision within the laws of the Commonwealth for private sewer companies. As a result, only single corporations or individuals may install facilities of this nature. This requirement eliminates the use of such intermediate sized facilities for housing developments but does allow them for apartment complexes and for condominiums where there is a clearly identifiable single owner/operator.

Permitting of individual septic systems is a responsibility of DLWU which has been delegated to the local boards of health except as staged above. At present, individual home package treatment plants are not permitted in Massachusetts, because it is felt that they are exceptionally difficult to operate and are, therefore, unreliable for continuous use. DLWU is required to issue permits for land disposal sites for septage under Chapter 111, Section 31d.

The Wetlands Program of DLWU represents the appeal level of the Hatch Act, General Laws, Chapter 131, Sections 40 and 40a, which are administered at the local level by town conservation commissions. These commissions are charged with the responsibility of guaranteeing that, without suitable permit,

> No person shall remove, fill, dredge, or alter any bank, fresh water wetland, coastal wetland, beach, dune, flat, marsh, meadow or swamp bordering on the ocean or on any estuary, creek, river, stream, pond, or lake or any land under said waters or any land subject to tidal action, coastal storm flowage, or flooding (MGL, Chapter 131, Sec. 40).

The conservation commissions issue permits and may issue "orders of conditions" for specific activities within the wetlands as they are defined within the Act. If the private party, the state, or other individuals, such as abutters, wish to appeal the decision of the local conservation commission they may do so to the Wetlands Program within ten days of the conservation commission order. The regional engineer then reexamines the case presented to it by the conservation commission and the individual appealing and may issue a superseding order within seventy days of receiving the appeal.

The significance of the Wetlands permitting procedure within the Commonwealth is twofold. The first is that it allows to the locality considerable autonomy; the state role is one only of administrative review. Second, large scale sewerage facilities often cross, run through, or are located within an area classified as a wetland, thereby granting local environmental review of wastewater planning. In addition, any appeal made is required to go through the MEPA procedure to receive an additional environmental clearance. A more detailed discussion of Chapter 131, Sections 40 and 40a and of the role of conservation commissions in general may be found in, Massachusetts Association of Conservation Commissions, Massachusetts Conservation Commission Handbook, 1973.

Environmental Impact Review (MEPA)

The Environmental Impact Review procedures within the Commonwealth are a portion of the Office of the Secretary of the Executive Office of Environmental Affairs. The Massachusetts Environmental Policy Act, Chapter 30, Sections 61 and 62, went into effect on July 1, 1973. The law established an environmental review process for state actions which may cause damage to the state's natural environment and also requires that potential damage from these actions be minimized. MEPA covers directly all projects and activities of state agencies, projects or activities financed with state monies or projects and activities of local redevelopment authorities, housing authorities and development commissions. MEPA indirectly covers private and local public activities or projects that need permits or licenses from state agencies. It specifically does not cover local projects not requiring state permits and certain types of state funded projects which were granted categorical exemptions. Significant among these categorical exemptions are sewage treatment facilities permits issued by the Division of Water Pollution Control.

Several observations about the MEPA process should be made. It is a general review procedure which requires only "environmental honesty," and does not mandate levels of environmental quality. Much like the NEPA process it is a means of assessing the likely environmental damage. Seventy-seven percent of all submissions to MEPA from its inception to September 1975, were "negative assessments." While it is argued that the intent of the Act is in part to raise stage agency awareness to environmental damage, the number of projects claiming no damage appears high. Further, categorical exemptions to MEPA of 92-500 projects removes a significant area of consideration from the MEPA process. Several critics have felt that these limitations of the intent of the act and its implementation may have removed the act's justification and left behind only another means of harrassment for private contractors and smaller state and local agencies who must wade through yet one more cumbersome segment of the state bureaucracy before proceeding with construction. Against these arguments, conservationists have argued that MEPA, no matter how weak, does allow for State Environmental Review. Through the Environmental Monitor published by MEPA biweekly, the public is informed of the pending actions and decisions of EOEA on specific projects within the state. In addition, the full environmental reviews that MEPA has required have been useful in minimizing environmental damage. Finally, even though DWPC is exempt from the MEPA process, construction of sewers and sewage treatment plants generally requires permits issued by departments other than DWPC and those permits require a MEPA review on specifically the aspects of the project being covered by the permit.

Office of Coastal Zone Management

The Office of Coastal Zone Management (OCZM) is located within the Office of the Secretary of EOEA. At present there is not an approved Coastal Zone Management Plan and as a result, review of activities in the coastal zone are handled by the Coastal Review Center (CRC). In addition, the CRC is on the A-95 distribution list of the Office of State Planning and informally reviews most submissions to MEPA which affect the eighty-seven coastal cities and towns.

Office of State Planning

The Office of State Planning (OSP) is the principal state agency outside of the Executive Office of Environmental Affairs concerned with environmental planning, though not with environmental regulation. OSP has been actively involved in the development of a state policy on growth management using an extensive "bottom up" participation effort on the part of the cities and towns. The first preliminary statement of the policy was published in 1975 in Toward a Growth

Policy for Massachusetts. The statement included as a significant policy variable the control and direction of sewerage facilities so as to discourage the flight to the suburbs. This statement was followed by a year-long effort by volunteer committees in each community in the state to draft a response to a questionnaire on preferences about various components of growth management. These "Local Growth Policy Committees" prepared statements on growth management in their town, and each regional planning agency prepared regional summaries of the responses in member communities. These in turn were summarized by OSP and were published with recommendations for further articulation of the state growth policy in City and Town Centers: A Program for Growth in 1977.

With respect to wastewater treatment, communities recommended that state and federal funding for facility planning, design and construction be increased, that all potential solutions (including non-traditional management alternatives) be eligible for funding, and that the state's water quality standards be relaxed for smaller communities.* The "Recommendations" Chapter of this report suggests ways in which the Commonwealth can implement conclusions made in the Local Growth Policy Statements. Recommendation 29 states that as a matter of policy, the state should "require the state Division of Water Pollution Control to size and locate sewer facilities in compliance with local growth policies and plans "** as part of an overall strategy to realign public investment decisions with the desires expressed in the local statements. Recommendation 29 goes further to say that the Division should expand the Step 1 facilities planning process to include a general evaluation of a community's water quality problems "instead of a document for rough planning and justification of a previously agreed upon construction program."+ It is interesting that this report only mentions the areawide water quality management planning process in its discussion of community Local Growth Policy Statements (indicating that few communities themselves mentioned the 208 plans). This recommendation is also interesting in light of the volunteer nature of the local statements: the committees were generally appointed by town managers, town meeting moderators or by mayors. Requirements for a public hearing on the local statements may not always ensure that the statements offer a representative sampling of public opinion on these issues and thus may not constitute any more of a broad based attitude than the plans imposed by the Division without the local input.

The OSP has had two significant roles in environmental planning beyond the philosophical role played in the Growth Policy project. OSP was the agency responsible for the State's 208 and regional population projections. This effort should have given OSP, as architect of the basic population distribution pattern for the Commonwealth, a major role in shaping both the direction of growth in sewerage facilities and, following on this availability of sewerage, the direction of growth of the population as a whole. It is unlikely that the population projections prepared by OSP will have this impact for two reasons. First, the majority of the Step 1 submissions that will be funded under the backlog of federal funds were submitted to DWPC before the OSP projections were ready. Second, the EMMA study which may determine the shape of sewerage expansion in Eastern Massachusetts contains a detailed analysis of population growth using a different technique (EMPIRIC) which produced a quite different geographic distribution of population from the MAPC projection.

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*OSP, Cities, Towns: A Program for Growth. Mass. Growth Policy Report, September 1977, p. 7.

**Ibid., p. 80.

+Ibid.

The second role which OSP plays in the planning of wastewater facilities is both formal and informal. OSP is the State A-95 agency and as a result is responsible for review of all federally funded projects, in particular wastewater treatment facilities under 92-500. The role of OSP in this area is one of review for consistency and lack of regional overlap. In addition, in their review of specific projects, they exert whatever pressure is possible within the political structure at both the state and local level to discourage construction of facilities with excess capacity.

The General Court

The General Court of the Commonwealth of Massachusetts is a bicameral legislature composed of a lower house of 240 members and an upper house of thirty-one members, each elected for two year terms. Its size and complex committee structure make it a somewhat cumbersome institution. A joint commission of the General Court, The Special Commission Relative to the Effects of Present Growth Patterns on the Quality of Life in the Commonwealth, authored the Massachusetts Growth and Development Policy Act of 1973.

B.5 Federal Agencies: EPA, U.S. Corps of Engineers and New England River Basins Commission

Environmental Protection Agency

EPA Region I responsible for administering the Construction Grants Program in the Study Area. Figure B-11 shows the EPA Region I organizational structure. They review Step 1-3 applications for compliance with the various established guidelines (cost effectiveness, user charges, industrial cost recovery, etc.). The NPDES program has not been delegated to the Commonwealth, and is currently executed jointly by EPA Region I and the Division of Water Pollution Control (DWPC). Region I also prepares environmental assessments, negative declarations and, where felt necessary, environmental impact statements. The 208 Level B plan for the area is the NERBC SENE study.

The Corps of Engineers

The study area lies in the New England Division of the Corps of Engineers and includes parts of the Merrimack, Narragansett Bay, Blackstone, and Massachusetts Coastal Area Drainage Study Areas. The New England Division participates in the range of Corps water resources activities, including flood control, wastewater management, water supply, beach stabilization/erosion control, navigation and so on.* Several of their planning and construction projects are important to the research at hand.

Permits for dreding and filling, disposal of dredge spoils, or construction or navigable waters are issued by the Corps.

The Charles River Natural Valley Storage project is a carefully planned program of federal acquisition and protection in perpetuity of some 8400 acres of the marshes, swamps and low lying areas of the Charles River floodplain for the purpose of reducing flood damages. This example of a non-structural solution to flood damage reduction is one of only three in the United States.** Maintaining the natural valley storage has an important effect on regulating dry weather riverflows, and the acquired acreage will insure a substantial wetland habitat area for low intensity recreation along the River's edge.

The existing Charles River Dam (which forms the Charles River Basin) leaks salt water into the Basin, has inadequate lockage facilities for peak and growing use by recreational boaters and has insufficient pumping capacity for flood control. The Corps is replacing the old dam 2250 feet below the present location.

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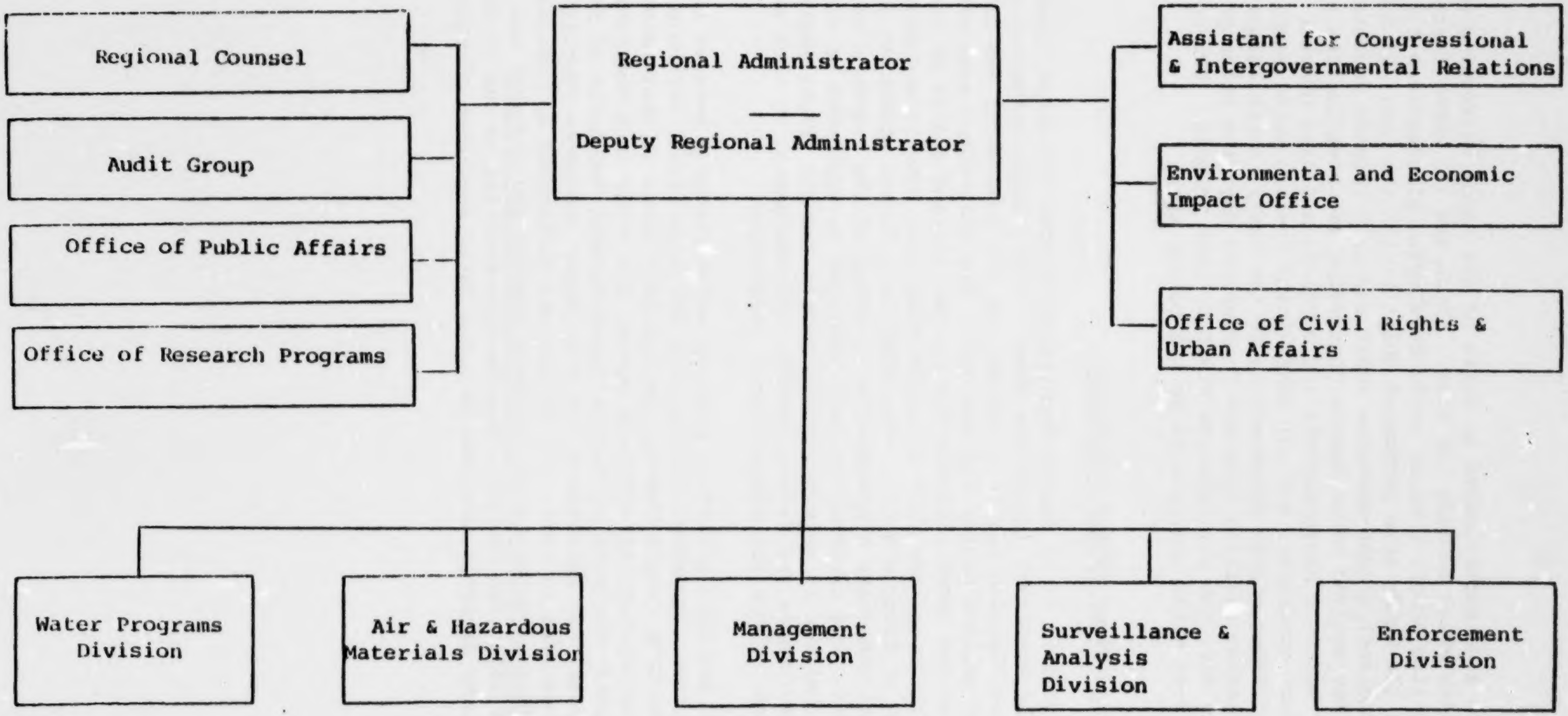
*A comprehensive description of the Division's current activities in the study area can be found in their publication Water Resource Development in Massachusetts, Waltham, Massachusetts, 1975.

**Council on Environmental Quality, Environmental Quality, 6th Annual Report of the Council on Environmental Quality, Washington, D.C., December 1975. p. 202.

Figure B-11

Environmental Protection Agency
Region I


Regional Counsel
Audit Group
Office of Public Affairs
Office of Research Programs
Regional Administrator
Deputy Regional Administrator
Assistant for Congressional & Intergovernmental Relations
Environmental and Economic Impact Office
Office of Civil Rights & Urban Affairs
Water Programs Division
Air & Hazardous Materials Division
Management Division
Surveillance & Analysis Division
Enforcement Division

The Corps also participated in three of the major wastewater management planning studies which include the Area. These are (1) EMMA (Eastern Massachusetts Metropolitan Area), a major study developing alternatives for wastewater management in the Study Area performed jointly with the MDC; (2) SENE (South Eastern New England) a comprehensive water and land related resource study sponsored by the New England River Basins Commission and covering the study area as well as other parts of Massachusetts and Rhode Island (see Chapter 2 for a comparison of study coverage); and (3) NEWS (North Eastern Water Supply) a major examination of water supply alternatives in the Corps' North Atlantic Region covering all basins draining into the Cheasepeake Bay, the Atlantic North of the Chesapeake Bay, the St. Lawrence River or Lake Ontario. The Corps also is beginning some water supply work in the Boston area.

New England River Basins Commission

The New England River Basins Commission (NERBC) was established in 1967 by order of the President (Executive Order 11371), under authority of the 1965 Water Resources Planning Act (P.L. 89-80), at the request of the Governors of the six New England States and New York. The geographic area within the jurisdiction of the NERBC includes the six New England states in their entirety plus those portions of New York State draining into Long Island Sound (the East River westward to Throg's Neck). The NERBC is a formal mechanism for coordination of federal and state comprehensive planning of the region's water and related resources. The chairman of the Commission is appointed by the President and the vice chairman is selected by the member states. State members are designated by the Governors and federal members are designated by each secretary and the chairman of the New England Power Commission.

The NERBC has been active in planning water resource uses in the New England Area, ranging from commercial fishing, the 200-mile limit, offshore oil drilling, and so on. The SENE (South Eastern New England) study is their most important effort for this project. As mentioned above, the study is a comprehensive water and land use study for most of Eastern Massachusetts and parts of Rhode Island. The study proposal was approved by the U.S. Water Resources Council and the New England Governors in 1968, and funding was authorized by Congress in 1971. Their report (How to Guide Growth in South Eastern New England) was released in December of 1975, and contains considerable material of use to this study. NERBC is becoming directly involved in urban water resources planning in the area.

B.6 Consultants

Institutional analyses frequently focus on those organizations which easily fit into the government hierarchy: federal, multistate, regional, state, substate regional, and local. In modern times, the aged term "political milieu" has been replaced by Public Interest Groups as we have done below. For wastewater management, such a structure serves to ignore a key element in the planning process: the consulting engineer.

In many instances, the consulting engineer is the de facto decision-maker, with his own incentives and constraints which affect his decision.* In the Sacramento Case Study, Wandesforth-Smith & Trant** pointed out the tight relationship between consultants and bureaucrats (even going so far as to coin the term "consultocrat"), and the ubiquity of a few organizations in the process.

The 1974 EPA review of the construction grants program recognized the importance of the consultant:+

> "The selection of a qualified A/E consultant is probably the most important decision that a grantee makes. The consultant, who generally prepares the facilities plan, designs the project, and oversees project construction, probably influences the cost-effectiveness of the project more than anyone else."

A full list of the firms involved in wastewater planning would have little value, and we have not attempted to include one. We have, however, tried to provide the consultant's viewpoint (along with the agency's) in our analysis where relevant.

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*B.K. Collins; J.G. McGibbon; and C. Binkley, Water Resource Project Selection at the Local, State and Federal Level, prepared by USR&E under CWRR contract 14-31-0001-3702, January 1973, p. 42, 85ff.

**G. Wandesforde-Smith and J. Trant, Some Political and Institution Considerations, prepared for NSF, contract 76-SP-0425, p. 29-34.

+Construction Grants Review Group, Review of the Wastewater Treatment Works Program, EPA, Washington, D.C., November 30, 1974, p. 9.

B.7 Public Interest Groups

Public agencies tend to be relatively permanent, and to have well-defined roles in the planning process. The same is true for public interest groups. Watershed and basin-oriented public interest groups in the study area tend to be concerned with any plans or facilities impacting their areas, and are influential in the wastewater management process. Other public interest groups have a more universal focus, such as the Sierra Club, while others (such as the loose organization of Quincy citizens around Hough's Neck) are even more localized. Rather than providing a list of these organizations,* we have attempted in the text to relate environmental group membership to the public involvement process where appropriate. In many cases, for example, it may be individuals who are significant, rather than the groups to which they belong; in others, the reverse may be true, and we have tried to identify those cases. The public involvement procedures at each stage of planning are described in the text.

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*The EPA Directory of Environmental Groups in New England lists over 70 with headquarters in the study area alone, and is not complete by any means.

APPENDIX C

GLOSSARY OF ACRONYMS USED

106	The state strategy for water pollution abatement which includes the state priority ranking list, referring to Section 106 of P.L. 92-500.
201	Refers to the construction grants section of P.L. 92-500, Section 201.
208	The areawide wastewater management section of P.L. 92-500.
209	River basin planning under the Water Resources Planning Act and funded by Section 209 of P.L. 92-500 (Level B Plans).
303e	River basin planning, required by Section 303e of P.L. 92-500.
701	Comprehensive planning funded by HUD.
A-95	Mandatory intergovernmental review of Federal projects, established by OMB Circular A-95.
A/E	Architects/Engineers.
APAC	Areawide Planning Advisory Council of the 208 Project.
AWT	Advanced Waste Treatment, treatment beyond secondary.
BHA	Boston Harbor Associates.
BHCAC	Boston Harbor Citizens' Advisory Committee, formed by EPA.
BRA	Boston Redevelopment Authority
BTPR	Boston Transportation Planning Review
CAC	Citizens' Advisory Committee (208 project; see also BHCAC).
CDM	Camp, Dresser, & McKee.
CEQ	Council on Environmental Quality
Clean Water Act	The 1977 Amendments to P.L. 92-500.

CoE	U.S. Army Corps of Engineer (Civil Projects).
CRPCD	Charles River Pollution Control District.
CRWA	Charles River Watershed Association.
CTPS	Central Transportation Planning Staff.
EDQE	Department of Environmental Quality Engineering of EOEA.
DLWU	Division of Water Pollution Control of DEQE.
DWPC	Division of Water Pollution Control of DEQE.
EIR	Environmental Impact Review for MEPA.
EIS	Environmental Impact Statement for NEPA.
EMMA	Eastern Massachusetts Metropolitan Area, and a wastewater management study by the MDC and the Corps of Engineers using the EMMA region.
EMMMR	Eastern Massachusetts Macro Metropolitan Region.
EMPIRIC	The EMPIRIC Land Use Allocation Model.
EOEA	The Massachusetts Executive Office of Environmental Affairs.
EPA	Environmental Protection Agency.
General Court	The legislature of the Commonwealth of Massachusetts.
gpcd	Gallons per capita per day.
HUD	U.S. Department of Housing and Urban Development.
ICR	Industrial Cost Recovery, and ICR provisions of P.L. 92-500.
MAPC	Metropolitan Area Planning Council.
MDC	Metropolitan District Commission, a part of EOEA.
MEPA	Massachusetts Environmental Policy Act.
mgd	Million gallons per day
MGL	Massachusetts General Laws
MSD	Metropolitan Sewer District, a portion of the MDC.
M&E	Metcalf & Eddy, Inc.
NCWQ	National Commission on Water Quality.

NEPA	National Environmental Policy Act.
NERBC	New England River Basins Commission.
NEWS	North Eastern Water Supply Study by the U.S. Army Corps of Engineers.
NPDES	National Pollution Discharge Elimination System.
NSF	National Science Foundation.
O&M	Operations and Maintenance.
OCZM	Office of Coastal Zone Management of EOEA
OMB	Office of Management of Budget.
OSP	Office of State Planning
PCP	Project Control Plan of the 208 project
P.L. 92-500	The Water Pollution Control Act Amendments of 1972.
POTW	Publicly Owned Treatment Works
REE	Regional Environmental Authority, of which the MAPC is an example.
RPA	Regional Planning Authority, of which the MAPC is an example.
SENE	South East New England Water and Related Land Resources Study by NERBC.
SESD	South Essex Sewer District.
SIC	Standard Industrial Classification.
SMSA	Standard Metropolitan Statistical Area.
Step 1	The planning stage of construction grants under Section 201 of P.L. 92-500.
Step 2	The design stage of construction grants.
Step 3	The construction stage of construction grants
SuAsCo	Sudbury, Assabet, and Concord River Basins.
TA	Technical Assistance.
Title V	The 1977 revisions to the Massachusetts State Sanitary Code.
UC/ICR	User Charge/Industrial Cost Recovery requirements of P.L. 92-500.
UMTA	Urban Mass Transportation Administration of the Department of Transportation.

APPENDIX D

METHODS OF FINANCIAL ANALYSIS

This appendix describes the procedures and data used in developing the estimates of financial impacts presented in Chapter 6. It begins with a description of the data used, and then steps through the various phases of the analysis.

Data

1. Existing MDC Costs: MDC Annual Report for Federal Year 1976; listing of expected expenditures and existing bonds (by payment amount and year of expiration) in MDC letter to communities on the allocation formula.

   These two sources provide data on current MDC Operations and Maintenance, the portion of that O&M paid for treatment, and the principal and interest payments for future years on bonds already issued.

2. Proposed MDC Costs: Kennedy Engineers draft report and EMMA. For each project proposed, constant dollar costs were estimated in the EMMA plan, along with dates for the beginning of each step of planning. We have assumed that O&M costs begin in the year construction is completed (or in the following year, when construction appears to end on December 31. Capital costs are assumed to be incurred at the mid-point of construction.

3. Local Costs: the 1975 Needs Survey, as analyzed by Kennedy Engineers, provides estimates for the total needs in categories 3A, 3B, 4A, and 4B for communities served by the MDC. These needs were used.

4. Population and Employment Projections: For the reasons described in our Phase I report, we used the estimates prepared by the 208 project. These gave estimated population and employment in dry, wet, and very wet industries by town for 1975 and 1995. We used the base flow estimates of 70 gpcd, and 170 gpd for each dry industry employee, 700 for each wet industry employee, and 2000 for each wet industry employee. Linear interpolation was used for intermediate years, and linear extrapolation for 2000.

5. MDC membership was assumed to stay constant.

6. Percent Sewered: 208 project data were also used here, and interpolated and extrapolated linearly for years behind 1975 and 1995. Percent sewered was constrained to be between 0 and 100%, of course, and was assumed equal for household and industry.

7. Town Median Income: 1970 census figures were used, inflated to 1975 dollars by the national ratio of median income 1975 to median income 1970.

8. Tax Rates and Assessed Valuation: The conversions prepared for 1975 by the Massachusetts Taxpayers Foundation were used to prepare equivalent assessed values and tax rates at 100% valuation for the base year.*

Costing of MDC Facilities

In the first step, total MDC system costs for each study year were estimated. A scenario was chosen for interest rate, inflation, grant eligibility, and method of cost allocation. Then for 1980, as an example, the total MDC costs would be the remaining MDC principal and interest costs on its current debt, plus existing operations and maintenance cost, plus the O&M costs for all facilities constructed between now and 1980, plus the local share of capital costs for those new facilities. It was assumed that the MDC would continue to use constant principal payment bonds, and that a twenty five year life would be chosen. Then the principle cost would be 1/25 of the total local share for each project on-line by 1980, and the debt service cost would be the interest rate times the remaining balance on the principal. The operations and maintenance on existing facilities was reduced in later years, since it was assumed that upgrading the primary treatment facilities at Deer and Nut Islands would eliminate the existing operations and maintenance costs for those facilities. No similar assumption was made for sewers because of lack of data; this could lead to an error of about .2%.

Inflation was added to the analysis by increasing geometrically the cost of expenditures in future years according to the inflation rate. Thus, all O&M costs would be increased by the rate of inflation to the year they were spent, while capital costs would be inflated to the midpoint of construction. Larger bonds would be required, but principal and debt service payments would clearly not increase after bonds were issued.

The result of this step is a total principal, debt service, and O&M cost for the MDC system for each of the years 1980, 1985, 1990, 1995, and 2000.

Costing of Town Facilities

The local facties are a bit more complex, but can be treated similarly. Because of data limitations, it was assumed that the communities had no remaining costs for capital in place, and no current O&M. This underestimate may lead to even higher local costs than projected. It was then assumed that the

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*Massachusetts Taxpayers Foundation, Inc. Municipal Financial Data, 1975.

Needs Survey estimates were to be implemented over 25 years, with 4% being constructed each year, and that operations and maintenance costs would be equal to 2% of the capital in place on each year. In other words, if construction started in 1975 at 4% per year, on a base project cost of $100 million with full grant eligibility, then by 1980, 20% of the project would have been built. This would imply a local capital investment of $2 million by that time, and annual O&M of $400,000, given 90% Federal and state assistance for capital.

Allocation of MDC Funds

The total population equivalents in a community for a particular year are the sum of population plus the contribution of major industries. Since per capita flow was assumed at 70 gpcd, this contribution was

$$\frac{170}{70}\text{ (dry industry emp)} + \frac{700}{70}\text{ (wet industry emp)} + \frac{2000}{70}\text{ (very wet emp)}$$

for the projection year. The local share of capital costs (principal and debt service) from the MDC was set as its total population equivalents over the sum of population equivalents for the whole system, where the current formula was used.

Sewered population equivalents for each community were simply the total population equivalents times the projected percent sewered, and the proportional flow of the community was simply its share of total sewered population equivalents. In the current formula, capital costs are allocated by share of total population equivalents, while operations and maintenance is allocated by share of sewered population equivalents. In the flow-based allocation, all costs were allocated by share of sewered population equivalents.

Preparation of Costs per Household and Other Indicators

In 1975, the average household had 2.97 members,* and that figure was used. Cost per household was simply the sum of costs for the community, divided by the total number of households. Cost per thousand gallons was computed similarly. To compute tax millage, the total community cost was divided by the total assessed value (in thousands) of the community; this gave a millage (of $/thousand of assesed valuation). Millage divided by current tax rate gives the percent increase in taxes, though a correction should have been made for the current MDC contribution to taxes. Similarly, dollars per household divided by household median income gave the per cent of median income.

Inclusion of Industrial Cost Recovery

The allocation to industrial cost recovery comes from the 75% Federal share of the capital cost. First, it is necessary to compute the portion of total flow arising from major industries, from the sewered population equivalents estimated above. Call this portion X. Then the total ICR burden for a particular facility in a particular year is

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*U.S. Bureau of the Census. Statistical Abstract of the United States, 1975. Table 51.

$$\text{ICR} = \begin{matrix}\text{Capital cost of facility}\\ \text{built in earlier year}\end{matrix} \times \begin{matrix}\text{Federal}\\ \text{share}\end{matrix} \times (X) \times (0.05)$$

The factor of 0.05 arises because industry can spread their payments out over twenty years with no interest charges. This can be summed for all facilities built up until the current year, to give the total ICR burden.** Then the ICR burden is divided by total industrial flow to give the charge per thousand gallons. For the purposes of this analysis, it was assumed that the MDC would, as intended by the Act, use its 50% of the ICR revenues for replacement of these facilities, investing the money until after the year 2000.

**To simplify the analysis, it was assumed that ICR would apply directly to the principle paid in a particular year. This affects the distribution of ICR over time slightly.

APPENDIX E

PUBLIC COMMENTS AND USR&E RESPONSES

APPENDIX E -- CONTENTS

1. Comments by Michael B. Cook, USEPA 198
   USR&E Responses. 217

2. Comments by USEPA Region I 219
   USR&E responses to comments by Daniel O'Brien. 230
   USR&E responses to comments by William Butler. 247
   USR&E responses to comments by Wallace Stickney. 261
   USR&E responses to comments by Rebecca Hanmer. 282

3. Comments by Martin Weiss, MDC. 283
   USR&E responses. 288

4. Comments by Fifi Nessen, EOEA. 289
   USR&E responses. 292

5. Comments by Thomas McMahon, DWPC 293
   USR&E responses. 299

6. Comments by Daniel McGillicuddy, DEQE. 300
   USR&E responses. 303

7. Comments by Shirley Brown, BHCAC 306
   USR&E responses. 308

8. Comments by Waldo Holcombe, Neponset Conservation Association. . . . 309
   USR&E responses. 311

9. Comments by Herbert Meyer, Mystic River Watershed Association. . . . 312
   USR&E responses. 316

10. Comments by Arthur Barnes, Norembega Association 317
    USR&E responses. 320

11. Comments by W. Gary Williams, Clearwater Consultants, Inc. 321
    USR&E responses. 324

12. Comments by John Murphy, Boston Harbor Pollution Committee 325

13. Comments by Lydia Goodhue. 330
    USR&E responses. 334

14. Comments by Howard Ris, Jr.. 335
    USR&E responses. 341

15. Comments by Margaret Hulls 342
    USR&E responses. 359

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OFFICE OF WATER AND
HAZARDOUS MATERIALS

OCT 24 1978

MEMORANDUM

Subject: Boston Case Study

From: Michael B. Cook, Acting Director
Facility Requirements Division (WH 547) Myron F. Tiemens for

To: Richard E. Morrison
National Science Foundation

We are enclosing our comments to the four draft contractor reports for the Interagency Boston Case Study. These comments primarily address the national issues discussed in these reports. However, they address each report separately. If, as has been suggested, the reports are combined into one executive summary, we feel that all the agencies should have an opportunity to do an intensive final review of that document also. In addition, we suggest that all submitted comments and discussion appear as an appendix in the final report. In particular, the comments from EPA Region I should be included; the summary of the status of wastewater treatment facility planning and construction in the Boston area is excellent.

Our comments follow:

Institutional Aspects of Wastewater Management, Urban Systems Research and Engineering, Inc.

- -On page 9 there is a recommendation that alternative selection be separated from construction grants funding decisions to allow communities to choose the wastewater facilities most attractive to them. ① The report recommends the determination of grants based upon national cost-effectiveness criteria while allowing communities to apply this grant to different alternatives as long as required pollution abatement is achieved. We would note that EPA's procedures for cost-effectiveness analysis include the consideration of several factors other than costs. Our *Guidance for Preparing a Facility Plan* states that significant costs, effects, and benefits should be displayed for alternatives which would result in compliance with all regulatory requirements. Since common units are lacking for measuring environmental, social, economic, and other costs, the selection of the most cost-effective alternative requires careful judgement. While total costs are the primary factor in ranking alternatives, our guidance also requires consideration of environmental effects, implementation capability, and other considerations. The ability to implement alternatives and to attain the necessary agreement among State, regional, and local governmental units or management agencies should be carefully weighed. Moreover, although cost-effectiveness procedures do not consider Federal and State funding formulas, the local household costs must not be excessive when compared to local median income. We believe it is uncommon for a commmunity to clearly prefer a viable project alternative which is different from the most cost-effective alternative which has been established through that community's facilities planning process. In the event that such conditions do exist, they should be individually addressed on a case-by-case basis. (1)

-On page 9 it is recommended that State priority lists be directly tied to Basin Plans. All State programs for determining project funding priority must consider the severity of pollution. To the extent allowed by the information in Basin Plans, we believe water quality concerns are currently reflected in priority lists. (2)

-On page 9 the report recommends an independent review of facilities plans and designs for small projects as well as for the large ones where "Value Engineering" is already required. Although this recommendation may have merit, there are practical constraints to more extensive review. Besides limitations caused by available resources, we desire to streamline the grants process wherever possible and simplify the procedures. We believe that a requirement for further review will lengthen and further complicate the process. Our new Cost-Effectiveness Analysis Guidelines, which were published on September 27, 1978 as part of the final Construction Grants Regulations, will provide more specific guidance to help ensure development of the most cost-effective alternative during the facilities planning process. (3)

-On page 11 the report recommends revised cost-effectiveness procedures to correct alleged inconsistencies in the handling of capital and O&M costs. The report suggests a discount rate of about 3 percent which is the sum of the constant dollar rate and the rate of inflation. EPA's cost-effectiveness analysis procedures are intended to identify the total resource commitments of alternatives at a national level. They call for use of constant dollars based upon current market prices and a low discount rate (currently 6 5/8 percent) which is less than the inflation-free rate based upon the opportunity cost (2) of capital concept (about 10 percent). This approach, rather than implying no future inflation, assumes that costs of all resources involved in facilities construction and operation will increase at about the same rate. Historically, both construction and O&M costs have inflated about 3 percent faster than the rate of increase of the general price level, and there is no reason to expect this to change greatly. Thus, our current discount rate of 6 5/8 percent very closely approximates the 10 percent opportunity cost rate less a 3 percent adjustment for the difference between construction and general inflation rates.

- On page 14 the report recommends expanded public participation in the Step 1 process with increased funding to help provide for effective public response. On August 7, 1978, the EPA Office of Water and Waste Management published in the Federal Register proposed ⑤ regulations to increase substantially public participation in the programs under the Clean Water Act. These regulations, once final, will significantly increase the opportunities for interested and affected taxpayer/citizens to become informed about and involved in the Step 1 facilities planning process. The regulations will require a public participation element in the Plan of Study, a detailed Public Participation Work Plan, additional consultation and public meetings between the grantee and the public early in facilities planning, the establishment of a Citizens Advisory Group (with a majority of members being private citizens or representatives of public interest groups), and the assignment of a public participation coordinator to staff the Citizens Advisory Council. Additionally, the regulations explicitly identify public participation activities as grant eligible and strongly encourage public participation efforts in Step 2 (design) and Step 3 (construction).

Sludge Management Planning in the Boston Metropolitan Area, Environmental Research & Technology, Inc.

- On page 43 of the Introduction the report recommends delay and staging for sludge disposal due to changing technology and regulation. The report cites uncertain incinerator technology and the possibility that ocean discharge may be allowed in the future. EPA recognizes the potential benefits of staging wastewater facilities in order to develop overall cost-effective programs. The Agency's new Cost-Effectiveness Analysis Guidelines require such staging within areas of rapid population growth. Interim sludge disposal programs may result in significant benefits from increased flexibility and technological development. However, delay cannot be accepted based upon speculation concerning future legislation.

- On page 49 of the Introduction it is recommended that, for disposal options such as co-combustion, the regulations be changed to allow a municipality to contribute construction grants funds for a portion of a private facility in return for partial ownership. Construction grants must go to public bodies created under State law with legal authority for the disposal of wastes. Such a public institution may use grant funds in conjunction with private capital for the construction of a multi-purpose project. However, the purpose of the construction grants program is to expand the nation's capacity to manage wastewater and grant funds are not available to purchase ownership in a facility which already exists.

-Page 51 of the Introduction implies that costs are the only consideration in cost-effectiveness analysis and recommends consideration of uncertainty. We would stress that while costs are the major consideration, several other factors must be considered in a cost-effectiveness analysis. As already discussed for a similar recommendation in the Urban Systems Research and Engineering Report, our guidance states that significant costs, effects, and benefits should be displayed for each alternative and careful judgement should be exercised when evaluating these alternatives.

-On page 52 the report contends that O&M costs are understated with respect to capital and recommends consideration of inflation in cost-effectiveness analyses. This issue is also addressed in the discussion of the Urban Systems Research and Engineering Report.

-On page 53 the report states that the decision by EPA to ban ocean disposal of sludge has been made without considering the environmental and economic aspects of alternative disposal modes. We would note an earlier statement on the same page of the report that P.L. 95-153 contains an outright ban on all ocean dumping of sewage sludges by December 31, 1981.

An Analysis of Water Quality Goals and Objectives in the Boston Metropolitan Area, Environmental Research & Technology, Inc.

-We are enclosing our previous comments on the draft report which should be considered in the final report. We especially note the need to change the Preface to accurately reflect current conditions. Facilities in the Boston area are still undergoing preliminary planning and there have been no funding commitments to construct any major wastewater treatment projects. Although some findings of the ERT study will serve as useful input to the ongoing studies, these findings will not serve to defer planning and design of major projects.

-On page 14 of the Executive Summary it is stated that the absence of Federal participation in funding O&M costs acts to bias the planning process toward large and highly capital intensive construction projects at the expense of adequate O&M of existing or small systems. ⑥ We do not believe that a Federal grants program of subsidies for O&M will necessarily result in the implementation of more cost-effective pollution control projects or improved O&M for projects once constructed. Our cost-effectiveness analysis procedures are based upon total costs irrespective of Federal and State cost sharing formulas.

-The recommendation appears to be primarily based upon an observation of planning for control of combined sewer overflow in Boston. Under section 516(c) of the 1977 Clean Water Act, a report has been prepared for Congress on combined sewer overflows which includes recommendations for grants programs. This report considers five funding alternatives including modification of the current law to provide funding for nonstructural control techniques. The report finds sewer flushing to be the most cost-effective nonstructural alternative but concludes that potential cost savings associated with nonstructural management practices may be more theoretical than actual. The report recommends continuing the present practice of funding capital construction costs.

Phase II Engineering Report Boston Case Study, Kennedy Engineers

-Page S.6 of the final report should note that P.L. 95-217 discontinues grant eligibility of facilities for stormwater pollution control.

-Page S.11, item 6, states there was no EPA guidance on sewering of unsewered areas before the end of the study period. We furnished such guidance with our comments to Richard Morrison of December 29, 1977. We are again enclosing this guidance. In addition, the revised construction grant regulations which have several provisions concerning small or unsewered communities were available in interim form from April 25, 1978; they were issued in final form on September 27, 1978.

-We have previously commented further on this report and reference those comments at this time. Not all of the comments have been responded to.

-Page S.11, item 2, states there are no criteria to limit the size of grant eligible facilities or their design period. As noted in our December 29, 1977 letter, this subject is thoroughly discussed in the Cost-Effectiveness Analysis Guidelines in Appendix A of the Construction Grants Regulations.

MEMORANDUM

Subject: Boston Case Study

From: Michael B. Cook, Chief
Facility Requirements Branch (WH 547)

To: David W. Tundermann
Council on Environmental Quality

This is to furnish our comments on Environmental Research and Technology's report, "An Analysis of Water Quality Goals and Objectives in the Boston Metropolitan Area."

The draft report raises several important issues, most of which will require further consideration prior to completion of the final report. We feel, however, that one modification is necessary before the draft report is distributed for review. Following resolution of this issue, we suggest an immediate distribution of the report. The Task Force is already far behind schedule and we feel that reports ready for review should be distributed as soon as possible.

The Preface states that every significant element of the present Boston wastewater management plan is inadequate and will result in excessive costs and further degraded water quality. There are inadequacies in the water quality planning for the Boston area and the report does a good job of identifying these problems. However, it is unfair to imply that an EPA commitment to implementing the EMMA plan currently exists or that it represents the last word for pollution control facilities in the Boston area. Currently, an Environmental Impact Statement is studying satellite AWT alternatives and there are two infiltration/inflow studies being conducted. Moreover, a large grant will soon be made to analyze the combined sewer problem. This ongoing planning activity involves consideration of several alternatives, in addition to those recommended in the EMMA plan. Therefore, the Preface should be changed to more accurately reflect the existing situation.

The report includes a very interesting discussion of problems resulting from the chlorination of combined sewer overflows and effluents from primary treatment facilities. The report notes the limited effectiveness ⑦ of such disinfection, the possible production of carcinogenic compounds and the toxicity of the high chlorine residuals. Based on these concerns, the report questions the efficacy of the EMMA recommended detention/chlorinatio facilities and primary treatment for ocean outfalls. On page 1-16, the report states: "The outfall from the Nut Island primary treatment plant is located at the seaward edge of Quincy Bay and is a major influence on water quality in the Bay." On page 1-19, the report notes further: "If EPA were to discount this (chlorination) practice, secondary treatment would be required at Deer and Nut Islands on water quality considerations alone, regardless of the stipulation of section 301(b)(1)(B)." Page 4-19 indicates: "Bacterial concentrations are consistently in violation of the class SB water quality criteria throughout most of this section (Boston Outer Harbor). The source of these high bacterial concentrations, however, seems as much the untreated sewage overflows to Boston Inner Harbor as the chlorinated Deer Island effluent. When Deer Island is not chlorinating, however, this situation is reversed and the Deer Island effluent is the primary source of bacteria (and other associated pathogens) in the Outer Harbor and a major contributor to other sections of the Harbor as well." The significance of secondary treatment for ocean outfalls is summarized on page 7-2. "Because of the active biological oxidation and increased solids removal in the secondary (treatment) step, the removal of bacteria and presumably pathogenic organisms increases to 99 percent beyond that achieved by primary treatment alone. Removal of metals and other contaminants also increases with increasing solids removals."

The above statements indicate that a significant water quality benefit will result from secondary treatment of the ocean discharges. The ERT findings contradict commonly held beliefs. On January 18, 1978, we furnished you with our comments on the Urban Systems Research and Engineering (USR&E) draft Political and Industrial Issues Report. Page 59 of this report states that there is an almost unanimous opinion that secondary treatment at Deer Island is an unreasonable requirement which would probably have no water quality benefit to the harbor or nearby areas. The ERT findings are quite significant because they contradict this assumption. Other contractors working for the Task Force should be informed of these findings.

Specific comments on the ERT report follow:

-The ERT Category I alternatives include sewer cleaning, repairs and rehabilitaion to eliminate excessive infiltration and inflow. These measures are assumed to result in significant reductions in the pollution loadings from combined sewers. In developing the costs for Category I alternatives, Kennedy Engineers neglected to include the costs associated with the reduction of infiltration and inflow. Since ERT used the Kennedy estimates, this problem requires correction. The Kennedy Engineers' cost estimates are now being corrected before their report is distributed for review.

-The report considers two alternatives for control of the combined sewer problem. Besides the EMMA recommended detention/chlorination facilities, automated dry weather flushing of combined sewers is considered. Conventional sewer flushing of small pipes may be a viable alternative but there are limitations to the widespread use of automated flushing systems. As noted in the report, field tests have not yet confirmed the effectiveness of such systems for large pipes. While flushing may effectively reduce suspended solids and BOD, its effectiveness is questionable for controlling potentially harmful bacteria and viruses. Suspended solids and BOD will deposit in sewers with low gradients and essentially remain until they are resuspended either by flushing or by high flows during wet weather. Coliform bacteria, however, will be deposited and die-off. The remaining bacteria will eventually be resuspended. The die-off rate in the sewers will be slower than those observed in receiving waters because of the absence of ultraviolet light, salinity, and the warmer wastewater temperature. Nevertheless, the report overestimates the removal efficiency of flushing because the bacteria are treated as a conservative (non-diminishing) constituent.

The significance of bacteria die-off within the sewer is uncertain and must be confirmed by field tests. However, it is possible that a substantial proportion of the bacteria observed in combined sewer overflows can be associated with the sanitary wastewater in the sewer rather than the resuspended deposits. Use of the flushing alternative alone would permit continued discharge of untreated sewage from combined sewers during wet weather. While sewer flushing of some of the smaller pipes in a combined system may be worthwhile, such flushing would only be one element of a more comprehensive program required for control of combined sewer overflows.

-We suggest that ERT consider another combined sewer control alternative featuring limited upstream flushing of smaller pipes, holding basins at strategic points in the system, rehabilitation of sewers and regulatory works, and finally treatment of the stored flows during off-peak periods at the plants.

-On page 5-6, it is stated: "Loading factors for nitrogen (N) and BOD were directly from Heany et al. Those for phosphorus (P) were five times those used by Heany et al., to simulate more closely phosphorus concentrations reported for urban stormwater runoff (EMMA, Vol. 8; APWA 1977)." This is a major assumption which greatly affects conclusions regarding the need for urban stormwater runoff control since phosphorus is the controlling substance. The justification for this assumption should be explained in more detail in the final report. Had this assumption not been made, there would be an 80 percent reduction in stormwater loadings from those used in the water quality simulations. This is also significant because the report cites the need for street sweeping to control stormwater pollution. The street sweeping technology recommended exceeds current technological capabilities. Moreover, every city street would have to be swept once every day.

-Another important assumption which affects the phosphorus simulation is explained on page 6-7. A problem results from the simulation of non-steady-state rainfall events by using steady-state techniques. The phosphorous model simulates water quality for a seven-day 10-year low-flow condition. Stormwater runoff and combined sewer phosphorus loads are considered but nonpoint source loads are not. It seems more reasonable to consider all three loads in the same manner. The elimination of nonpoint source loads may, in part, have been responsible for the need to increase urban stormwater phosphorus loads by a factor of five.

-On page 7-4, it is stated that urban stormwater, raw sewage bypasses, and combined sewer overflows constitute the most serious pollution problems in urban areas but receive the least attention of the Construction Grants Program. The 1977 Clean Water Act eliminates Federal assistance for control of pollution from separate storm sewers. However, combined sewer projects are grant eligible, if cost-effective and required to protect the beneficial uses of receiving waters. Although provision for funding of secondary treatment of dry weather flows must be made first, we have funded many combined sewer projects and do not consider them to be low priority if needed to enhance water quality.

-On page 7-5 the high costs for urban stormwater and combined sewer controls are noted. It is stated that cost estimates have been astronomical because of an inability to distinguish between traditional concepts of flood control and pollution control. Considering only the requirements for pollution control, the 1976 Needs Survey estimates needs of $19.3 billion for combined sewers and $57.2 billion for facilities to control stormwater pollution. EPA has provided guidance on determining grant eligible costs of combined sewer overflow projects and on allocating costs (PRM 77-4) of multiple purpose CSO projects.

-On page 10-4 it is stated:

> "The cost-effectiveness analysis for infiltration/inflow correction in combined sewer systems for example, is simply wrong. I/I correction costs seem typically to be compared with the apportioned costs of treatment of the additional flows which reach the existing treatment plant(s). The correction costs should be compared with the costs of wet weather overflow control facilities which would be necessary to provide the same level of wet weather pollution abatement, or with the costs of the additional sewerage necessary to make up for the existing wet weather flow capacity occupied by the I/I. The scope of the cost-effectiveness analysis might productively be broadened to consider the costs and/or benefits to all environmental sectors."

PRM 75-34 (PG61) specifies the procedure for analyzing inflow into combined sewers. As stated above, the purpose of the combined sewer analysis is to determine the most cost-effective means of protecting the beneficial uses of the receiving water. The PRM recommends use of a graphical display to aid the analysis of marginal costs and water quality benefits for each alternative. This approach is different from the infiltration/inflow analysis for separate sewers which ERT incorrectly assumes is applicable to combined sewers.

-On page 8-2 it is stated that all ID options include 100 mgd of additional wet weather capacity at Deer Island. The report assumes the extra capacity is necessary to treat wastewater from combined sewer flushing. If so, the inclusion of this extra capacity for other alternatives appears unwarranted.

-The title of the report should be changed to show that it is an analysis of alternatives as well as an analysis of goals and objectives.

WH 547:JKingscott:COC:rm:1137:x58056:3/24/78
bcc: concurrence
    WH 547 reader
    RRB (4)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 30 1975

THE ADMINISTRATOR

SUBJECT: Encouraging Less Costly Wastewater Facilities for Small Communities

FROM: Russell E. Train

TO: Regional Administrators
Regions I-X

I would like to enlist your efforts to deal with the serious problem of high costs of wastewater treatment facilities in small communities. The costs are for the local share of construction of municipal treatment works and for the subsequent user charges. A series of newspaper articles and increasing Congressional interest are two manifestations of growing local concern. The costs are particularly burdensome on populations of communities under 10,000 that require new wastewater collection systems.

We have recently analyzed the seriousness of the problem in a national survey of completed facility plans for communities of less than 50,000 in population. The conclusions and recommendations emerging from our study are discussed below.

Survey Results

Our survey this summer included 258 facility plans from 49 states. The results indicate that operation and maintenance plus debt retirement of the local share for recommended new facilities will cost in excess of $100 per household per year in 40 percent of the communities and $200 per household in 10 percent of the communities. Costs exceeded $300 per household per year in several cases. Communities under 10,000 experienced much higher costs on the average than larger communities.

Of the 258 facility plans, 83 were for completely new collection and treatment systems. Three-quarters of the 83 indicated costs in excess of $100 per household per year and one-fifth in excess of $200 per household per year.

A rough idea of the significance of these numbers may be gained by considering that the median annual family income in the U.S. is approximately $13,000. Hence, $200 per year represents over 1.5 percent of the median family's annual income and $300 per year represents over 2.3 percent of an average family's annual income. If, as one might expect, the median annual income in small communities is less than the national average, the cost burden is actually higher than these percentages indicate.

Virtually all the facility plans surveyed recommend conventional collection and treatment systems when such systems did not already exist. They were justified by one or more of several conditions, including increasing population density, septic tank-soil absorption systems failures and subsequent water quality degradation, soil conditions unsuitable to on-site disposal of wastewater, and State and local public health standards.

The facility plans, with some recent exceptions, generally did not analyze the alternative of non-sewered systems for small communities even where potentially cost-effective. Such systems include septic tank-soil absorption systems with community maintenance programs and other small treatment systems for individual homes or small clusters of homes.

This alternative appears to have been overlooked in part because it is not in the facility planner's ordinary vocabulary of solutions. Widespread failure of septic tank-soil absorption systems due to poor installation and maintenance has resulted in a general conviction in the profession that conventional sewerage and treatment systems provide much better protection of ground and surface waters. State health standards have often reinforced this conviction. EPA personnel have determined, perhaps erroneously in some instances, that some of these solutions are ineligible for grants. Finally, facility plans have generally been based on conservative factors that predict relatively large populations with high water use.

Unavoidable High Costs

Costly projects in many municipalities are, of course, unavoidable due to high construction costs, soil and climatic conditions which do not lend themselves to inexpensive systems, and stringent water quality standards requiring advanced waste treatment. Where relief is essential in these situations, EPA is at this time primarily dependent on publicizing additional financial support available from other Federal agencies such as the Farmers Home Administration. Headquarters is also considering other measures such as the amendment proposed last year to Section 202 of Public Law 92-500. The amendment would limit the Federal share for projects to secondary treatment except where the grantee demonstrates that some more stringent level of treatment is the cost-efficient means of achieving the beneficial use of the receiving water.

Measures to Reduce Costs

Headquarters is taking a variety of measures to reduce costs where possible for wastewater facilities in small communities, as follows:

- changes to the secondary treatment requirements to eliminate disinfection except where required by water quality standards, and allow for less stringent limitations on suspended solids for small treatment lagoons.

- Program Requirements Memorandum (PRM) of August 16. 1976, requiring that facility plans present local capital and operation and maintenance costs in readily understandable form and that this information be presented at all public hearings on facility plans.

- A PRM in preparation to emphasize that adequate consideration should be given to low-cost systems, and to provide guidance on the eligibility of septic tank-soil absorption systems, or alternative systems serving individual homes and small clusters of homes.

- a modification to the cost-effectiveness guidelines which establish policies and guidelines to ensure cost-effective sizing and staging of treatment works.

- development of a two-day seminar by the Office of Technology Transfer, for public officials, consulting engineers and other interested parties on small wastewater treatment plants and individual home or on-site treatment devices.

Action Requested

I ask that you ensure that the measures outlined above are fully implemented. Especially careful attention should be given to facility plans for smaller communities that appear to have a low income per household compared to the costs that must be borne. As a rule of thumb, this would include communities for which average local debt retirement costs per household exceed 1% of estimated local median family income or for which local debt retirement costs plus user charges average more than 2% of the estimated local median family income.

1. A project must provide the most cost-effective method of waste treatment required to meet local conditions and must satisfy State and Federal requirements, including water quality standards.

2. A project must be owned, operated, monitored and maintained by a municipality as defined in Section 502 of P.L. 92-500 and 40 CFR Part 35.920-1 and 35.925-5(b).

3. The facility must be located on public property except where easements will suffice, such as for installation of sewers or if easements are obtained from property owners providing access to and maintenance of facilities located on private property.

4. Secondary treatment as defined by EPA regulations or some more stringent level required by water quality standards must be the minimum treatment provided if effluent is to be discharged to a stream or other body of water.

5. Septic tank leach fields or other land disposal techniques must meet local, State and Federal ground water and public health criteria.

6. Vehicles and associated capital equipment required for servicing of the systems are also grant eligible.

a. Vehicles purchased under the grant must have as their sole purpose, the transmission or transportation of liquid wastes from the collection point (e.g., holding tanks) to the treatment facility. Neither general maintenance vehicles nor other types of vehicles are allowable for grant participation.

b. The grantee is required to maintain property accountability in accordance with FMC 74-7 and 40 CFR 30.810 on all vehicles and equipment purchased under the grant.

Systems serving only an individual home are not eligible for Federal funding. However, septage treatment systems and vehicles purchased as provided in 6 above to serve a group of individual family systems are eligible.

IV. Implementation

This policy should be emphasized through preapplication conferences, contacts through municipalities and the states and reviews of grant applications.

References:

P.L. 92-500, Section 502; 40 CFR 35.920-1 and 35-925-5(b); 40 CFR 30.810; FMC 74-7.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SUBJECT: Less Costly Treatment Systems

FROM: John T. Rhett, Deputy Assistant Administrator
for Water Program Operations (WH-546)

TO: Regional Administrators
Regions I-X

Evidence is accumulating rapidly that many of the wastewater treatment facilities funded, or planned for funding, are too expensive for the local population. Four communities faced by this problem have recently received widespread publicity. They are Walton, New York; Dunkirk, Ohio; Greenville, Maine; and Humboldt County, California.

Headquarters review of a sample of facility plans indicates many more exceedingly expensive projects are planned, particularly for small communities.

We have found from this review that systems, such as new or renovated septic tanks and holding tanks, for individual homes and small clusters of homes have sometimes not been considered carefully even when likely to be far more cost-effective than collection and treatment networks.

I ask, in view of this serious situation, that the regions ensure that facility plans contain a complete and careful cost-effectiveness analysis of alternatives involving maintenance and/or new construction of treatment systems for individual families and small clusters of families wherever these alternatives are feasible in the planning area. The necessity for this analysis should be emphasized through preapplication conferences, contacts with municipalities and the states, and reviews of grant applications.

Headquarters, for its part, is continuing study of local funding problems created by the grants program. We also are considering alternatives for legislative relief.

We have, in addition, prepared the attached draft Program Requirements memorandum for your comment.

It states that small treatment systems serving clusters of homes are eligible for Federal funding. "Honey wagons" and septage treatment systems designed to serve a group of individual family systems are also eligible. A new system serving only an individual family home is not eligible even though this approach should be carefully considered in the facility plan to meet local needs.

Please send your comments on this draft memorandum to Michael B. Cook, WH-547, (426-9404) of my staff by September 10, 1976.

Attachment

cc: Water Division Directors

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Construction Grants
Program Requirements Memorandum No.
PRM # 76-3

SUBJECT: Presentation of Local Government Costs of Wastewater Treatment Works in Facility Plans

FROM: John T. Rhett, Deputy Assistant Administrator for Water Program Operations (WH-546)

TO: Regional Administrators

ATTN: Water Division Directors

I. PURPOSE

This memorandum provides Agency policy concerning the presentation of local Costs of wastewater treatment works in Facility Plans and public disclosure of this information.

II. DISCUSSION

Section 35.917-1(h) of the Construction Grant Regulations requires that a facility plan include a "brief statement demonstrating that the authorities which will be implementing the plan have the necessary legal, financial, institutional, and management resources available to insure the construction, operation and maintenance of the proposed treatment works." Further, Section 35.925-5 requires that the Regional Administrator shall, before awarding grant assistance, determine "that the applicant has:

(a) agreed to pay the non-Federal project costs and

(b) has the legal, managerial and financial capability to insure adequate construction operation, and maintenance of the treatment works throughout the applicants jurisdiction."

The financial assurances would have little basis unless those served by the treatment works are informed of their costs. The quality review of facility plans during the past year has shown that many lack financial information on non-Federal debt service or operation and maintenance costs and that, even where such data are presented, these costs are not usually translated into charges for a typical residential customer. Some EPA regions have indicated that most residents to be served by grant funded treatment works will be unaware of their financial obligations until construction of the works is 30% complete and user charges have been determined.

This problem would be eliminated and the goals of public participation served better by including an estimate of project costs to users and taxpayers in the facility plan. Such a public estimate would also create a climate favoring careful consideration of the least cost alternatives, including greatest possible use of existing public and private facilities.

III. POLICY

A. Financial Information

The facility plan shall present the cost information listed below. These may be only rough estimates, and may be presented as a range of possible costs when major unknowns exist such as whether or not substantial parts of the project are grant eligible.

1. Estimated total capital costs for the recommended treatment works, a breakdown of estimated eligible and ineligible costs, and the estimated Federal, State, local governmental and industrial shares of the capital costs.

2. The expected method of local financing and estimated annual debt service charges or taxes (based on the expected interest rate for municipal borrowing) on the total local capital cost of the recommended treatment works.

3. Estimated annual operation and maintenance costs and the estimated industrial and local government's shares thereof for the recommended treatment works.

4. The estimated monthly charge for operation and maintenance, the estimated monthly debt service charge, the estimated connection charge, and the total monthly charge to a typical residential customer.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

CONSTRUCTION GRANTS
PROGRAM REQUIREMENTS MEMORANDUM
PRM # 76-

SUBJECT: Eligibility of Septic Tanks, and Other Small Treatment Systems

FROM: John T. Rhett, Deputy Assistant Administrator for Water Program Operations (WH-546)

TO: Regional Administrators, Regions I-X

ATTN: Water Division Directors

I. Purpose

This memorandum provides guidance for the interpretation of the construction grant regulations relative to the eligibility of the costs of septic tanks, holding tanks, and package plant treatment systems serving individual homes and small clusters of homes.

II. Discussion

During the facility planning stage, alternatives for providing for wastewater treatment systems are explored to determine the most cost-effective method of treatment required. Review of a sample of approved facility plans indicates that new or renovated septic tanks, holding tanks or package plant treatment systems have sometimes not been considered carefully even when more likely to be cost-effective than collection, interceptor and treatment networks.

III. Policy

Facility Plans should contain a complete and careful cost-effectiveness analysis of alternatives involving maintenance and/or new construction of treatment systems for single family homes and small clusters of homes wherever these alternatives are feasible in the planning area. This analysis should be conducted for all alternatives regardless of eligibility for Federal funding.

Septic tanks, holding tanks and package plant treatment systems serving small clusters of homes are eligible for funding for State approved and certified projects when the following minimum standards are met:

B. Public Disclosure

The above information for the proposed plan shall be presented during the public hearing on the facility plan.

IV. IMPLEMENTATION

This policy shall apply to all facility plans for which public hearings are held on or after January 2, 1977.

★U.S. GOVERNMENT PRINTING OFFICE: 1977—757-008/0019

RESPONSES TO COMMENTS BY
MICHAEL B. COOK

1. We appreciate your comments on the considerations in cost-effectiveness analysis. While cost appears to be dominant in most situations, the other factors should always be stressed, and we have made changes in the text. Your statement that "it is uncommon for a community to clearly prefer" an alternative which is not the most cost-effective may be true, but the case-by-case analysis you propose would appear to make the community specifically reject the most cost-effective option before going further. We think national needs, particularly for O&M, would be better served by allowing the communities to make positive choices, rather than entering adversary positions vis a vis EPA, as has occurred in the case-by-case approach, and therefore stand by our recommendation.

2. The key statement in the comment is "to the extent allowed by the information in Basin Plans". While the comment is generally true, the level of information is often so limited as to be useless, so that the proposed facilities are only marginally related to water quality. This is the point we wished to make, and we have revised the text to clarify it.

3. The comments are correct, except when it is realized that most plants can not achieve compliance, often because of problems in design (see, for example, the recent draft report by Energy and Environment Analysis on Evaluation of Municipal Wastewater Treatment Operations Under the NPDES Permit/Enforcement Program, prepared for OPE). Given that result, which we also found locally, attempts to provide more extensive review would appear to us to be more valuable in the long run than attempts to "streamline the process".

4. The proposed discount rate of 10% in real dollars is essentially equivalent to 18% in current dollars, or roughly equivalent to low-volume credit card purchases. This seems to us to be unreasonably high, though arguments for rates from 3% real to 10% real have been raging in public finance circles for decades. Our financial analysis includes rates of 3%, 7%, and 10% in real dollars, but 3% appears to us to be correct. In any case, O&M relative inflation is not considered in the cost effectiveness procedures, and should be.

5. We have referenced the comments in the text. While they will clearly not streamline the grant procedures, we believe they have merit.

6. We agree that "a Federal program of subsidies for O&M will (not) necessarily result in the implementation of more cost-effective pollution control projects or improved O&M for projects once constructed." However, the training support provisions contained in the Act should be implemented with a reasonable budget, O&M costs should not be placed at a disadvantage compared to capital costs as is the current procedure, and the funding should be arranged so that it is to no one's advantage to skew the analysis towards high-capital cost projects.

RESPONSES TO COMMENTS BY MICHAEL B. COOK (Continued)

7. The issue of secondary treatment requirements for Boston Harbor will be resolved through EPA actions on the current MDC waiver. We reiterate our statement that the parties interviewed, who are currently planning the wastewater treatment in the Boston area, were almost unanimous in their belief that secondary treatment would result in few, if any, benefits. As with any other issue, however, opinion is not necessarily identical to fact. Please see the response to this comment in the Water Quality study.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

October 17, 1978

Richard E. Morrison
National Science Foundation
Room 1240
1800 G Street N.W.
Washington, D.C. 20550

Dear Mr. Morrison:

The Environmental Protection Agency Region I staff has prepared detailed comments on the Boston metropolitan area wastewater management case studies, and I am enclosing them with this memorandum. These detailed statements principally cover the comments made by individual regional office staff members at our September 26 meeting with you and the consultants who prepared the studies. Material has been added for clarification and to stress important points. In addition, I am also enclosing a full copy of the remarks presented by Deputy Regional Administrator Rebecca W. Hanmer at the public meeting conducted the following day.

Our comments include a great number of specific criticisms concerning unsupported conclusions, misstatements, and errors of fact that we have found throughout the case study drafts. A major focus of many of these criticisms concerns the failure of the case studies to adequately recognize the substantial wastewater management planning changes that have been made over the past two years in the Boston area. The errors and misstatements must be corrected, and all of the conclusions must be based upon sound analyses, if the final case study reports are to be presented as credible documents. I expect that you will make the necessary revisions. I recognize, of course, that for certain of our comments there may be honest differences of opinion and that all of the changes we recommend may not be made. In these instances, I request that our pertinent comments be included with the reports as appendix material.

As a final comment, it is my opinion that planning for effective wastewater management in the Boston metropolitan area is now underway. Where necessary, the conclusions and recommendations of past plans are being amended and improved. This is a natural consequence of the facilities planning and environmental impact statement preparation processes that have been, and will be conducted. I am confident that cost-effective solutions will be expeditiously implemented for the water pollution problems that now affect Boston Harbor and its tributaries.

Sincerely yours,

William R. Adams Jr.

William R. Adams
Regional Administrator

enclosure

EPA REGION I COMMENTS

BOSTON METROPOLITAN AREA WASTEWATER MANAGEMENT CASE STUDIES

CONTENTS

Comments Prepared by Daniel O'Brien, Municipal Facilities Branch:

- Comments on ERT - Water Quality Report
- Comments on USRE Institutional Report
- Comments on ERT Sludge Report
- Comments on Kennedy Engineering Report

Comments Prepared by William Butler, Water Planning Branch:

- Boston Harbor Case Study, ERT Report on Water Quality

Comments Prepared by Allen J. Ikalainen, Systems Analysis Branch:

- Comments on "An Analysis of Water Quality Goals and Objectives in the Boston Metropolitan Area"

Comments Prepared by Wallace Stickney, Environmental Impact Office:

- Boston Harbor Case Studies

Comments Presented by Deputy Regional Administrator Rebecca Hanmer at September 27 Public Meeting:

- EPA Statement on NSF Boston Harbor Study

COMMENTS PREPARED BY DANIEL O'BRIE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

COMMENTS ON ERT - WATER QUALITY REPORT - DRAFT FINAL REPORT - DECEMBER, 1977

Executive Summary:

Many of the contractor's remarks are addressed in our individual chapter comments, so they will not be repeated here. However we do have some comments on the executive summary format as follows:

1. The contractor's recommended plan on CSO control should be described in more detail to include: Number of flushing stations and sweepers needed, area to be covered, frequency and duration of flushing and sweeping, need for any off-line storage and/or chlorination, mention of 3200 miles of sewer rehabilitation.
2. When it is mentioned that certain water segments will be degraded, it should be followed by a list of the reasons for degradation, e.g. satellite plants, runoff, inadequate CSO control, etc.
3. There should be some acknowledgement of the re-evaluation of the EMMA plan that has or will take place.

Chapter 1, Page:

3 - Discussion here implies that the recommendations of the EMMA Study will be followed without further study. This is totally misleading. Major suggested revisions to the recommended plan have already taken place. The whole CSO control strategy is the subject of a recent $5 million facilities planning effort.

4 - We feel that the contractor's statement about foreclosure is a bit premature given the review of the EMMA Plan that is taking place and always was intended to be done.

10 - Per Capita flow figures do not take into account industrial and commercial contributions.

11 - In regards to sewer capacities, the EMMA CSO plan also included additional transmission lines.
  - It is not clear how the contractor's recommended plan of sweeping/flushing/storage addresses the bacteria/virus problem. This issue should be elaborated upon.

24 - The EPA Draft EIS recommended against satellite plants due to their inability to meet Water Quality Standards.

28 - The contractor's predictions about the destrafication program do not correlate with the early monitoring results of this project which show increased D.O. levels, no hydrogen sulfide problems and little increase in turbidity.

38 - It is not clear if the costs shown here and on 1-40 include the costs of sewer rehabilitation.

39 - Our comments on the contractor's definition of benefits are presented later.

Chapter 3, Page:

6 - The assumption that EMMA was approved due to concern for federal financing eligiblity is unfounded. It is unclear what eligibility was supposedly of concern i.e. funding of the EMMA report itself or funding of its' recommended plan.

16 - We would just like to note that the State Water Quality Standards were in the process of revision at the time of report preparation. The contractor was aware of this process, but failed to acknowledge it in the report. The "recommended" criteria developed by the contractor are in many ways similar to the revised State standards.

31 - The revised State standards utilize the MPN criteria in marine waters.
  - The revised standards no longer has the coliform exception noted here.

Chapter 4, Page:

19 - Did the contractor confirm as part of this study that the Port Norfolk Sewer is still blocked?

Chapter 6, Page:

1 - The EMMA Study purposely relied on water quality information from Federal, State and private studies that were either existing, on-going or proposed during the study period. In addition, the MDC relied on their own long-term plant records for wastewater information. This approach was taken to maximize the use of existing data and avoid duplication. We would also like to point out that the contractor on this study did not conduct any new data collection and in many cases relied on "textbook" values for their water quality predictions.

Chapter 7, Page:

2 - It is not clear if the chlorine concentrations discussed here refer to dosage or residual.

3 - The use of one local technical journal article as being representative of what "AWT means in Boston" is not appropriate. AWT needs are decided on a case-by-case basis and can not be generalized.
- The discussion of pretreatment on land application systems fails to mention the impact of industrial wastes on this option.

4 - It is not clear what future open space use can be realized if the land acquired must be used for land application. The implication is that sometime in the future the land will not be needed for treatment purposes.
- The current flows in the MDC system are about 430 MGD with the proposed design flows at 586 MGD. Please elaborate on the statement that the projected flows are twice the current flows.

7 - CSO control alternatives for the Boston area will be thoroughly investigated in a $5 million Facilities Planning effort that was initiated in June, 1978. The recommendations of the EMMA Study were only preliminary and will not be blindly followed.

4.

7 - Please provide an estimate of the number of automated in-line storage systems in the U.S.

Chapter 8, Page:

2 - Is alternative I.D.1 the 100 MGD expanded Deer Island capacity referenced here?
- Do all Category III alternatives include the $270 million EMMA CSO Plan?

21 - It is not clear whether the column headed "2000 (ID)" represents the water quality objectives or the results of implementing alternative ID. Or are these one and the same?

22 - This section should include information on the number of flushing stations and street sweepers needed, frequency of flushing and duration of daily sweeping for the Boston Case.

24 - We question the feasibility of suggesting a daily street sweeping program for a 25,000 acre area.

31 - The contractor fails to acknowledge that the EMMA Study also included additional transmission facilities as part of the CSO Plan.

38 - The availability of 12,000 acres of land is a key issue that was not adequately addressed by the contractor.

Chapter 9, Page:

1 - The statement that prior to 1977 available funding exceeded available projects is incorrect. Massachusetts has always obligated its' total annual allotment.
- We do not agree that "class violation" is the only parameter associated with water use. We feel that all eight parameters have either a direct or indirect impact. We do not see how the contractor concluded that such parameters as coliform, color or temperatures have no effect on water use.

7 - It is not clear whether or not the costs of alternative IA includes rehabilitation costs.
- For clarify, we suggest the following changes to Table 9-2:

I.D be changed to I.D.1
I.D.2/4a be changed to I.D.2-4a.

5.

9. - We feel that the assumption that a project has no benefits unless it results in an upgrading of water use class is too restrictive. Class violations are frequently caused by a variety of problems and hence require a variety of solutions. As individual components of an overall plan are completed, incremental benefits accrue. Simply because a single project does not in and of itself solve, say, a coliform problem does not mean that no benefits were achieved. Incremental increases in D.O. levels or reduction in the frequency of beach or shellfish closings represent benefits that are not acknowledged by the contractor's system. We can not outline a specific alternative system other than to request that incremental benefits be considered or at least acknowledged.

Chapter 10, Page:

5 - Your recommendation that an expanded R & D program on CSO control is well-taken. We feel that the special CSO study that is being conducted under the Clean Water Act of 1977 reflects this same concern. However, we feel that it may be unrealistic to imply that a 5-year R & D program is necessary (followed by local studies) before we attempt to address CSO problems. We feel that with the uncertainties of future federal funding we must proceed with the utilization of existing technologies while concurrently trying to incorporate emerging technologies into the planning process.

6 - Although the contractor's proposed system of basing the Federal Grant on a projects present worth may be calculated "relatively easily", we feel that the contractor did not address the more complex issue of assuring that proper O&M is carried out over the life of the project especially for alternatives such as street sweeping and flushing as the contractor recommends.
- We disagree with the contractor's remarks that there is no accountability in the planning process or that the EMMA plan would have "foreclosed any opportunity..."

Appendix D, Page:

17 - It is not clear why the contractor assumed that the (chlorinated?) effluent coliform concentration from Deer Island is the same as the unchlorinated effluent.

6.

Appendix E, Page:

6 - There was no efficiency curve provided for the vacuum sweepers.
  - It is feasible to recommend a 16-hour sweeping shift in this area of the country?

Appendix G, Page:

1 - The opening sentence here implies that there was a pipe-by-pipe analysis performed as part of this study. Was this the case?

Appendix I, Page:

4 - Was the contractor able to correlate any of the projected water use potential figures with actual water use figures in existing clean segments? Or for that matter in any segment regardless of existing water quality?

General - The contractor has directly equated water use potential with benefits. We feel that this is somewhat misleading. It implies to the public that an area with higher benefits has higher water quality when actually it just means that there is a larger adjacent population center. The system does not distinquish between different uses, i.e. bathing, fishing, boating. The system does not account for the non-human beneficiaries, i.e. fish and aquatic life, of clean water. If a body of water is clean, but not near a population center, there are very little benefits. We feel that since the suggested system is rather specific, likewise its' title should be specific and not use the broad term "benefit".

COMMENTS PREPARED BY DANIEL O'BRIEN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

COMMENTS ON USRE INSTITUTIONAL REPORT - DRAFT REPORT - UNDATED

Main Report, Page:

19 - The implication that EPA is no longer involved in the operation of the construction grants program in Massachusetts is misleading. Although certain activities have been delegated to the State, this delegation has not reduced EPA's involvement significantly. ①

21 - No mention of the Boston Harbor Citizens Advisory Committee (BHCAC) that was formed almost three years ago by EPA. EPA ✓ [illegible] ②

- Metcalf & Eddy's involvement as a "subcontractor on the EMMA work" is not clear and should be clarified. (2a)

26 - If the cut-off date of January 31, 1978 for data collection given here is correct, it would not correlate with the other contractor reports. Please check. ③

35 - The relationship between the SENE and EPA priorities is misleading. SENE gave the same priority to both CSO control and secondary treatment, put sampling second and had no priority on landfill problems. ④

37 - As you know, per capita increase allowances in flow are now prohibited by the 1977 Clean Water Act. ⑤

38 - In regards to the distribution of grant funds, we can assure you that once the MDC program starts drawing on the grant monies there will be a most definite shift in the distribution - To the "Urban Core" category. ⑥

39 - The grant amounts listed for 1977 (June '76 to March '77?) are much lower than our records show - $15 Million vs. $75 Million. (We did not check the previous years.) ⑦

41 - We would like to point out that EPA not EOEA initiated the coordination efforts on the Deer Island prison issue including a series of appearances in the Federal District Court.

- In regards to the last-minute planning referenced here, the Harbor Islands Plan developed in October, 1972 noted the conflicts on Deer Island and recommended abandonment of the prison. Representatives of the ⑧

City of Boston were on the Plan Advisory Committee and must have been fully aware of its' ramifications.

47 - Page 54 states that third year 208 funding is to be used "only" for implementation versus "primarily". Please clarify. ⑨

69 - No list of Step 2 grants was provided. ⑩

72 - The discussion here on local options is a bit conflicting. On one hand, communities complain that their nonstructural preferences were ignored, while on the other hand they complain that they were "forced" to develop septage management schemes on their own. Communities want septic tanks, but not the responsibility for septage disposal. The communities that had contracts with the MDC were given a 5-year lead time to develop local solutions and many took little, if any, action in this regard. ⑪

75 - We believe that given the form of local government in New England, areawide analyses leading down to limited local studies have not been very successful. Local 201 studies seem to be the most reliable, accurate form of decision-making. ⑫

80 - Westborough and Shrewsbury never received funds for Step 1 planning, but instead did the work on their own. ⑬
- We were unaware that Shrewsbury appropriated Step 2 funds for regionalization, since they are opposed to this solution.
- The regionalization study for the Concord area was done by MAPC, not DWPC.

84 - Actual on-site Corps resident engineering would only be on projects over $50 Million. ⑭
- EPA has not and does not intend to provide on-site inspection with their own personnel.
- EPA's involvement in projects as stated here and in other instances is greatly understated. Our involvement is much more detailed and is definitely not limited to the "largest and most controversial projects".

92 - We doubt that any EPA officials stated that our Step 1 review is cursory. ⑮

95 - Recent EPA Regulations and Guidance provide for more emphasis on less structurally-intensive solutions, however the contractor's proposed funding system would in essence in many cases result in subsidizing O&M costs which is currently not allowable. In addition, EPA has insufficient resources to see that these "O&M funds" were being obligated properly. ⑯

3.

114 - In regards to local UC/ICR systems, once the MDC receives a grant that has UC/ICR requirements, it is required to assure EPA that all its' members will have acceptable UC/ICR systems. The requirement does not start; so to speak, with local grants. (17)

119 - EPA's current understatement of the impact of inflation is well-taken. Region I has been stressing this point for a number of years to no avail. (18)

123 - We believe that the contractor will find that Needs are less extensive than reported in many areas due to more recent emphasis on less-structural alternatives. (19)

128 - The intent of the pre-Step 1 EIS was to evaluate a wide range of options to be screened down to a few acceptable ones for the purpose of Facilities Planning. It was felt that with the MDC's recently completed 2-year EMMA Study that they might not be that receptive to launching into another longterm study of a number of alternatives. It was not meant to result in a single "fundable" option. However, this may be the case due to certain circumstances in the Boston area, e.g. land,water quality, industrial waste impacts, etc. (20)

RESPONSE TO COMMENTS BY
DANIEL O'BRIEN

1. Thank you for your correction; this has been revised in the text.

2. We do not cnsider the BHCAC to be a public interest group, but rather a vehicle through which the public can make their views known to the agency.

3. The statement is correct.

4. The regionwide SENE recommendations do not include "secondary treatment", but rather place the following recommendations at the same level:

- o Emphasize treatment of urban stormwater overflows;
- o Accelerate federal grants for municipal wastewater treatment.

Both are part of a planning objective "to achieve swimmable-fishable waters by 1983 wherever realistically attainable economically, socially, and technically."

We agree that, in practice, EPA has attempted to give the CSO problems a very high priority, but secondary treatment is a more immediate requirement (initially due to the 1977 deadline). We have rewritten the section to attempt to make our comment less misleading.

5. This has been referenced in the text.

6. No response is necessary.

7. This material has been revised in the text.

8. This has been revised; we appreciate the comment.

9. The attempt was to distinguish between National EPA requirements and Region I policy statements. We have attempted to clarify this in the text.

10. Now included, and we appreciate your efforts to provide the list.

11. We agree that there are inconsistencies in the local actions, and would like also to point out that the communities complaining about funding of nonstructural alternatives include several who have carefully developed septage management plans. However, others are attempting to do as little as possible, and these should be subject to enforcement. We have attempted to clarify the text on this issue.

12. To the extent that there are actual areawide issues, such as groundwater recharge and basinwide water balances, they will be ignored by the approach proposed in the comments. However, as a short-term solution, please note that local studies are exactly what we propose for continuing 208 efforts.

RESPONSE TO COMMENTS BY DANIEL O'BRIEN (Continued)

13. Thank you for the clarification. Westborough and Shrewsbury have (to date) received no federal funds for facilities planning. This has been corrected in the text. Our interview notes indicate that it has been the Westborough Town Meeting, rather than Shrewsbury, that has refused to accept the regional alternative. The 208 work in the Concord area was done at the same level of detail as everything else in the Basin reports; not enough information was developed on which to base a decision about regionalization.

14. The involvement we were attempting to evaluate was on Steps 2 and 3, and particularly on review of plans and specs. We have corrected the text to clarify this.

15. See No. 14 above.

16. The proposed system would subsidize a portion of the total costs of the project (not just capital), which would clearly include O&M. It also would clearly require new legislation. We disagree, however, that the EPA has insufficient resources: the review would be similar to the current one, and the O&M payments would be automatic except in cases of non-compliance.

17. Our concern was with local systems implemented in advance of MDC grants, and we have revised the text accordingly.

18. No response necessary.

19. This is clearly possible; since reduced costs benefit us all, it would be desirable. We have included this point in the text.

20. This is the best reason yet presented for starting the EIS before step 1 planning, and we have referenced it in the text.

COMMENTS PREPARED BY DANIEL O'BRIEN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

COMMENTS ON ERT - SLUDGE REPORT - DRAFT FINAL REPORT
MARCH, 1978

Executive Summary, Page:
(Arabic Numerals Have Been Used)

25 - Pilot testing of dewatering alternatives would be conducted prior to design.

26 - The EIS recommended the use of filter presses (pending additional studies) to ensure a higher percent solids.

27 - There is a strong possibility that the MDC will request to re-examine the feasibility of pyrolysis, prior to design, due to the recent advances in this field. They may also investigate what considerations are involved in the retrofitting of a multiple-hearth incinerator to a pyrolysis mode.

28 - The coincineration option was lower in annual costs if grants were not considered, but was higher after grants were applied. The coincineration option was less expensive to the City than monotreatment so they did realize a "cost savings", but at the expense of the MDC. This point was the main flaw in the coincineration option. The City would in essence be using MDC's eligibility under 92-500 to reduce their own costs. This information is all summarized on Tables 1 and 3 of the Stone and Webster Report.

29 - The Air Quality section of the draft EIS has been revised substantially.

30 - We do not see the relationship to the Boston Case Study of the fact that landspreading is successful in many small, midwestern cities.

31 - In the "upgrading" EIS, EPA recommended composting of about 25% of the secondary sludge and felt that there was a reasonable market for this amount. We question the feasibility of suggesting that both primary and secondary sludge be composted without a more detailed marketing study being done. In addition, given the timing on implementation of a pretreatment program and the higher nutrient value of secondary sludge, we feel that the EIS recommendation is more realistic.
- The summary should include the land area requirements for a composting operation on Deer Island.
- The suggestion for distribution of compost to member communities in proportion to their flow contribution is appealing, but merely amounts to "passing the buck" unless a market can be established. In addition, given the development in this area, compost markets are probably inversely proportional to flow contribution.

32 - The issue of ocean dumping/discharge is a national one which the EIS did not attempt to address in much detail, however we feel that the intent of Congress on this subject is fairly clear given the legislation enacted over the last five years or so.

40 - The discussion on eligibility here is a bit misleading. All MDC - related facilities are already totally eligible, so that increased eligibility would not directly effect MDC costs. However, it could be assumed that if the City had less expenses it would reduce the "tipping fees" for its' customers, such as the MDC.

42 - The "upgrading" EIS did in essence develop a hybrid option that included incineration, composting and landfilling.

43 - The feasibility of implementing an interim short-term solution has a few drawbacks as follows: unavailability of a realistic short-term solution, uncertainties on future Federal funding,more stringent regulations, more evidence of adverse impacts of certain land-related options.

46 - The new MDC ordinance has been promulgated. We believe that its' delay was caused by a lack of Federal pretreatment standards, not a lack of political acceptance.

48 - Performing an EIS on a recommended action does not constitute rejection of that action.
- It was felt that by the time secondary treatment came on line, an effective pretreatment program would be in place, not that secondary treatment would reduce the metals content of the sludge.

49 - The EIS was not the sole cause for delay. The promulgation of the new Clean Air and Resource Recovery Acts added to the delay and were hurdles that the MDC would have had to clear anyways, possibly after they had started design.

52 - The contractor's points on inflation are well-taken.

56 - The MDC recently initiated a comprehensive 2½-year study on, among other subjects, pretreatment.

57 - In a letter dated January 7, 1975 from former EPA DRA Johnson to former MDC Commissioner Sears, it was recommended that the option of coincineration with the City of Boston be explored. This suggestion was made before it was even decided to do an EIS and over a year before the Draft EIS was eventually published . The contractor's description of this sequence of events is wrong.

COMMENTS PREPARED BY DANIEL O'BRIEN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

COMMENTS ON KENNEDY ENGINEERING REPORT - DRAFT FINAL REPORT - MAY 1978

CHAPTER 1, PAGE:

47 - Under point number 2, the four EMMA CSO plans were mentioned on page 14 of the new permit.
- It should be noted that points 2 - 5 are addressed in the ECSL.

50 - FY77 was not the first year that an extended list was used. Similar contingency lists existed in FY75 and FY76.

57 - Discrepencies between number of permits and discharges is probably due to the fact that one permit may include a number of discharges, e.g. 5 municipal plants in Boston Harbor are covered by 2 permits. Also, many of the industrial discharges probably do not require permits.

59 - Note that the Gloucester Plant is not under construction.

61 - It is possible that the Somerville and Moon Island facilities are classified under pumping stations.

63 - The "Moratoriums" in Framingham and Natick allow one gallon of wastewater
(64) to be added to system with the removal of two gallons if I/I.

67 - Page 4.24 of the report states that EPA has classified Logan a "major" discharge. Please clarify.

74 - Conclusion number 5 implies that Massachusetts was unable to obligate its' allotment from FY73 to FY76. This is not true. Annual allotments were always totally obligated.

CHAPTER 2, PAGE:

18 - Please indicate what percentage removal of grease is considered "average".
- The consultants imply that there are excessive amounts of both bacteria and chlorine in the effluent. Please clarify the point being made - better disinfection? Dechlorination needed?

31 - EPA's definitions of weekly and monthly averages are given in the permit. It seems that a check for compliance would be based on the monitoring requirements specified in the permit i.e. 5 times per week.

62 - The point being made about the addition of 6 new tanks on treatment capacity is not clear.

64 - Treatability studies would be required on this project without question. This point is also acknowledged in the EMMA Study on page 4-2 of Volume 10.

124 - Recommendations of the Draft EIS also indicate that replacing Nut Island is less expensive than rehabilitating it.

137 - Effluent limits would be placed on the expanded facilities once EPA is in a position to determine what limits are feasible. The anticipated performance of the primary facilities will be given due consideration as part of facilities planning.

CHAPTER 3, PAGE:

17 - Please reference the studies that indicate detention/chlorination is ineffective.

22 - Per capita flow figures should take into account the commercial and indus-
(23) trial contributions to the system.
(25)

23 - Page 4-3 of Volume 10 in EMMA states that a 30 percent removal in the primary process is anticipated. The 20 percent figure in your text includes a 10 percent return sludge load.

24 - The permit presumed that the future discharges would be approximately in the present locations, not that no improvements were necessary to the outfall system.

32 - EPA requires that the interest rate as published annually by the Water Resources Council be used in analyses, not a fixed rate of 7 percent.

36 - The H and E figure for Phase I and II was $46,202,000, not $42,202,000. It was updated from June, 1973 to January, 1975 prices in the EMMA study.

38 - Similarly, the annual O&M costs are based on June, 1973 prices, not January, 1975.

52 - Under point 3, it seems to conflict with page 2-124 that states that relocating Nut Island is less expensive.

56 - Your statement that 39 member communities have permits is incorrect. Permit files indicate that only nine (9) communities have permits.

62 - This section (and any related sections) should be revised to include the MDC needs.

65 - Revise table to include the SESD and CRWPCD needs (as the actual "communities").

66 - It is not clear how Scituate and Billerica can have secondary treatment now, but not by July 1, 1977.

69 - We would appreciate a revision to conclusion number 2 to also indicate the increase in flow and population due to the potential new members.

70 - Conclusions 5, 6 and 7 regarding per capita flows fail to take into account the commercial and industrial contributions to the system.

75 - We remind you again that the Needs Survey figures are incorrect.

77 - Findings to support conclusion 19 were incorrect, as noted on page 56.

80 - We are unable to correlate even your revised Needs figures with those actually published.

CHAPTER 4, PAGE:

6 - It is not clear how this list was developed, since page 3.66 of this report shows great collector needs in for example Billerica, Chelmsford and Hanover.

7 - It is not clear how the first two lists were pared down to the third list.
- The fact that the deductive analysis led to a list of five communities that are not even sewered should confirm its' inappropriateness, but this point is left unaddressed.

8 - We were unaware that the MDC had enforced Moratoriums in Natick and Framingham. We believe it was the State DWPC. Possibly, it was a joint ban.

9 - The fact that Hingham is tributary to the MDC does not automatically mean that they do not need a permit. If you have a discharge, you need a permit.

15 - Lists one member as 100% sewered. Page 3.54 lists 16 as 100% sewered and does not include the member listed here. Please clarify.
- The last sentence here is ambiguous. Please elaborate.

16 - Please provide the source of information for these "reported" raw sewage discharges.

17 - Although the data reported here was probably correct at the time of report preparation, we feel that since almost two years have passed now it would be appropriate to include somewhere in the chapter updated information on the corrective measures being taken by the communities listed.

28 - The construction of the Main Gloucester treatment plant is to be funded by a 90% State grant under special legislation, therefore it would not be on the priority list. Those plants listed are for small remote areas within

Gloucester.

29 - A Step 3 grant for connecting Marblehead's waste to the SESD plant was made in December, 1975 with the SESD as the grant applicant.

31 - Salem's waste is discharged through the SESD system. The project on the priority list was for internal interceptor work. Stating that Salem itself discharges raw sewage contradicts your own information on Table 4-1.

32 - Construction of the Hull plant started in early 1976 which was within your data collection period.

35 - Typo under number 1 - 62, not 52 MGD.

36 - Under number 4, should indicate that only one member is entirely sewered, not served. Present wording implies that there are extensive sewered areas that are not served. It might be clearer to just include all the member sewered percentage figures in the report, since so many are in the 90-99% range.
- Here again, we note that only nine (9) members have permits.

CHAPTER 5, PAGE:

1 - We seriously question the estimate of 400 overflow points. We feel that 200 would be more realistic.

4 - Similar to above comment. Suggest a figure of 150.

11 - Inventory given here seems to correlate well with our suggested figures above, i.e. 200, 150.

21 - Just for the record, bacterial limits have since been established for all waters.

61 - The statement regarding the issuance of a negative declaration on the CSO projects is incorrect. We will make that decision once facilities planning is completed. We have decided not to utilize the "Piggyback EIS" process, however the projects could very well require a "standard" EIS.

70 - "No data....rates above one MGD". Do not understand this statement.

71 - The report should address the difference between the Kennedy estimates for effluent coliform and the actual Cottage Farm records for this parameter.

84 - The Charles River grant did include step 1 and 2 costs.

85 - We agree that the permit language on CSO controls was too restrictive. Obviously now the MDC has been allowed to examine a number of design storms and treatment levels in their formal step 1 work.

90 - Under number 1, for the record, a $5 million step 1 study for CSO control was initiated in June, 1978.

- Once again, we feel that the estimate of "several hundred" overflow points is exaggerated.

91 - Under number 4, please list the beaches that have been permanently closed and the approximate date of closure.

92 - Under number 6, the statement regarding Boston is slightly misleading and oversimplified. While the statement is true in some cases, more often the combined sewers tributary to the redevelopment areas have been tied into the separated storm drains via regulator devices, to provide drainage relief in combined areas. The regulators discharge combined sewage to the separated drains when the downstream interceptors, which convey flows to the headworks, are surcharged.

93 - Under number 9, information supporting the 15% removal figure at Cottage Farm is not discussed in this chapter. Also, it would be more appropriate to present this figure in the context of a 5-year design storm. As it now reads, one would assume that this is an "average" removal figure. Your own statements on page 5.72 acknowledge that design flows for the facility have never been experienced.

94 - Under number 11, the implication that MDC is responsible for correcting all member CSO problems is misleading. Local improvements to sewer systems are to be carried out by the individual communities in many cases.
- Under numbers 12, 13 and 14, we have already acknowledged that the permit conditions for CSO control were established prematurely.

CHAPTER 6, PAGE:

15 - Here again the description of the BRA projects has been oversimplified.
- Please elaborate on the statement that "many of the combined sewers" are half full with deposition.

16 - The statements here on inflow are unclear, i.e. 309 MGD versus "no information on inflow". Please clarify.

34 - I/I analyses for the South and North MDC systems were initiated in November, 1976 and March, 1977 respectively. They have now been completed. (The enclosed sheet summarizes all recent MDC grant activity)

35 - Under number 1, no projects would be designed before the I/I analyses are done.
- Under number 2, this point was addressed by our comment on page 6.34.

36 - Under number 4, although the permit schedule may support this conclusion, it never would have occurred.

CHAPTER 7, PAGE:

4 - The whole discussion on grant eligibility is wrong. First of all, the

development criteria only applies in the funding of lateral sewer projects. Secondly, the criteria is based on the project service area development, not the whole community. Lastly, the service area must be at least two-thirds developed, not just in existence, as of October 18, 1972. Please rewrite.

9 - Marblehead was in essence"forced" to deliver their wastes to the SESD plant because this alternative was less expensive than the local plant option. However, as far as being "forced" to join the District a few years earlier, this point needs more documentation than was presented.

11 - Please include the increases in terms of flow and population as a result of the eight-member annexation.
- It should be noted that the EMMA Study itself acknowledged that three of the proposed members would not need sewers before the year 2000.

12 - Does the contractor really feel that documentation was required to support the quote shown here? The potential problems that were stated seem fairly clear cut.

13 - For the record, much more detailed guidance has since been developed on sewer need analysis and related subjects.

14 - Please clarify whether the quotes here are from the Region I geographical area or Region I - EPA.

28 - Conclusion number 1 is wrong.
- Provide more documentation for conclusion 5 regarding EPA's position on annexation.

29 - Under number 8, see comment on page 7.11.
- Under number 9, see comment on page 7.13.

CHAPTER 8, PAGE:

14 - For the record, the recently-created Boston Water and Sewer Commission distributed information on water conservation to its' users with the establishment of a uniform rate structure versus the declining block method that existed.

27 - If water billing methods were to be used for establishing sewer use charges,
(28) the use of flat, increasing block, decreasing block, peak or seasonal rate methods would not be allowable on EPA-assisted projects.

32 - The EPA EIS does include a fairly extensive section on water conservation.

33 - The new Clean Water Act does in essence put a limit on the "Grant Eligible Size" of facilities based on restrictions on per capita flows, industrial flow increase and additional emphasis on water conservation.

CHAPTER 9, PAGE:

8 - The MDC recently embarked on a 2½ year study through a consultant contract involving an industrial waste survey, industrial permit program, pretreatment requirements, user charges and industrial cost recovery.

23 - Discussion on the Needs Survey should be revised per our previous comments.

24 - We feel that the suggestion to do one EIS on all 52 EMMA projects is totally unworkable.

31 - Massachusetts obligated their total allotment on August 18, 1977 about 6 weeks before the deadline.

35 - We would appreciate more detail on the fifteen projects that were supposedly funded without being on a priority list.
- Regulations in effect at the time of report preparation allowed grants to be made from previous year priority lists.

39 - Many points about EPA's influence have been addressed through previous comments.

41 - The issue of Satellite Plants was to be addressed in the EIS and Facilities Planning Process and should be noted here.

44 - Statement "e" implies that Massachusetts had to reallot their funds for FY73 through FY76. This is misleading and incorrect. No grant money has ever been reallotted in Region I.

45 - Many of the summary points were discussed in the chapter comments. The
(46) attached sheet outlines MDC grant activity. The statement on 46 about a retroactive grant implies an improper action took place. This procedure is both allowable and common. The Step 1 grant was not for reimbursement alone as explained on the grant activity sheet.

CHAPTER 10, PAGE:

General: We did not review the cost estimates presented here in detail, but we will provide some general comments in this regard.

2 - The EIS does cover the "issue" of secondary treatment, but does not question its' need because of existing statutory requirements.

23 - We question the feasibility of suggesting that 3200 miles of sewer be rehabilitated or replaced.
- We feel that the contractors cost figures for this work are greatly underestimated based on our experience. We would suggest that the report include more back-up information for these estimates.

42 - The discussion of EPA's commitment to follow the EMMA Plan is greatly overstated.

66 - We question the feasibility of transporting 80,000 pounds/day of sludge 20 miles through the MDC sewer system to Nut Island. There is no discussion of the amount of carrier water needed to transport the sludge, the possibility of sludge decomposition or deposition along the way or the impact of the additional load on the plant operations. There does not seem to be a commensurate increase in the costs at Nut Island for this 40 percent increase in sludge loading.

71 - No mention of the 12,000 acres of land needed for this alternative.

96 - It is noted that except for those alternatives involving primary treatment, all plans are within 7 percent of the cost of the EMMA plan.

General - The discussion of alternatives is limited to their benefits with no mention of their adverse impacts.

MDC GRANTS UNDER P.L. 92-500*

NUMBER	NAME	STEP	DATE	AMOUNT	DESCRIPTION
C-250312	Charles R. Marginal	3	5/28/75	18,900,000	Construction of Detention/Chlorination CSO Facility for Charles R. Basin.
C-250313	Primary Sludge Management	1	7/8/76	136,000	Reimbursement of Havens & Emerson Report, plus funding for coincineration study.
C-250536	Nut Island I/I	1	11/9/76	441,000	Analysis phase for Southern System.
C-250507	Deer Island I/I, UC/ICR	1	3/8/77	625,500	Analysis phase for Northern System plus conceptual UC/ICR Study.
C-250620	Program Management	1	6/9/77	133,800	Development of computerized management information system and consultant qualification/selection system plus funding for additional staff personnel.
C-250459	Fore R. Siphon	3	7/21/77	3,175,800	Construction of replacement siphon in Quincy - Weymouth area.
C-250640	Dorchester Bay CSO	1	5/19/78	1,163,300	Facilities planning for CSO control alternatives in the Dorchester Bay Area
C-250641	Neponset R. CSO	1	5/19/78	295,800	Same for Neponset River
C-250643	Inner Harbor CSO	1	5/19/78	1,061,900	Same for Inner Harbor
C-250642	Charles R. CSO	1	6/5/78	824,400	Same for Charles River

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* Only for project within study area. Two other grants made for MDC facilities in Central MA.

AS OF 9/28/78

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: October 10, 1978

SUBJECT: Boston Harbor Case Study, ERT Report on Water Quality

FROM: William J. Butler, Chief
Massachusetts Planning Section

TO: Kenneth L. Johnson
Special Representative

The Boston Harbor report on water quality prepared by ERT does indicate the major water quality problems that still have to be addressed before full water quality benefits are realized in the Harbor and its tributaries. However, the report falsely implies that relatively inexpensive non-structural solutions, such as intensive vacuum street sweeping can solve these complex water quality problems. In addition the report contains many errors, in fact, leaves many false impressions, and makes recommenda- that are unworkable and/or untested.

Specific comments follow:

1. On page X the report states that "in 1974 the criteria for dissolved oxygen, nutrients and bacteria, precisely the quality parameters of most concern for Boston area waters, were either relaxed or effectively removed from the Massachusetts standards." This statement is false. In 1974, Massachusetts did remove the numerical limits for nutrients because they could not be supported scientifically. The state now relies on a narrative statement for all waters and point source discharge prohibition of nutrients to lakes to protect its waters from excessive algae-criteria for dissolved oxygen and bacteria were not relaxed in 1974. Further, major revisions to water quality standards have been made by Massachusetts in 1978. The ERT consultant who was aware of the proposed revisions in 1977 should have acknowledged them. Many of ERT's recommendations for revisions to the water quality standards were the same as Massachusetts had proposed in 1977 and adopted in 1978.

2. On page XI, ERT indicates that the EMMA plan substituted unspecified treatment technology limitations for combined sewage abatement instead of developing waste load allocations for critical pollutants. It is true that specific waste loads were not developed for combined sewage discharges and nonpoint sources. In general the majority of Phase I basin plans around the country did not adequately evaluate these sources of pollution. The 208 water quality management planning and state Phase II basin planning efforts are beginning to address these complex waste sources. The EMMA plan based its combined sewage recommendations on the assumption that there shall be no raw overflows based on a one-year frequency rainfall and that chlorination-detention facilities would be a likely receiver of the collected combined sewage. The discharge from these facilities would be to waters of low recreation potential because of physical limitations. The EMMA plan did recommend detailed facilities plans be prepared to more fully evaluate combined sewage abatement

to the Harbor's recreational waters will produce significant water quality benefits.

3. On page XIII it is implied that no water quality benefits would accrue by implementing the EMMA plan. I disagree - Reducing raw overflows of combined sewage, as described above, result in significant water quality benefits. Admittedly, the urban runoff problem must be evaluated and solved before full realization of water quality goals can be achieved. The report fails to acknowledge the incremental benefits that would occur from combined sewage abatement, such as an improved fishery in the lower Harbor and tributataries without necessarily achieving a swimming quality.

4. On page xiii necessary removals of pollutants from combined sewage and urban runoff are indicated. I assume these levels apply equally to all pollutants such as BOD, suspended solids, nutrients and coliforms although it is unclear. It is unlikely that the recommended intensive vacuum street sweeping and the combined sewer flushing can accomplish these removals. I agree with ERT that non-structural controls to urban runoff and combined sewage must be further evaluated and at a much greater effort. However, rather than relying solely on non-structural controls, they should be evaluated along with structural controls that may be needed. Hopefully, non-structural controls will be fully considered in the current combined sewage abatement facilities plans.

5. On page 1-4 it is stated that implementation of the EMMA plan will foreclose for the remainder of this century and opportunity for swimmable/fishable waters in the Charles, Mystic and Neponset Rivers and Boston Inner Harbor. ERT should have discussed the overall planning effort in the Harbor, not only the EMMA study. For example, the EMMA plan recommended satellite treatment on the Charles and Neponset Rivers to provide needed flow augmentation. Since the EMMstudy, an EIS further evaluated these facilities and concluded that they would violate water quality standards in both streams. Therefore, the EIS recommended they not be built. In addition, as recommended by the EMMA study, detailed facility plans for the combined sewage systems are now underway. It is true that the EMMA study did not adequately evaluate the urban runoff problem. However, the 208 agency has begun to address the problem. They have inventories storm drainage systems, conducted some sampling analyses of stormwater overflows and have indicated further studies that will be needed to solve the urban runoff problem. Solving the urban runoff problem will determine when swimmable/fishable waters will be achieved.

6. On page 1-13, ERT states that Massachusetts has not complied with section 303(c) of Public Law 92-500. Section 303(c) requires each state to review its standards and hold a public hearing at least once during each three year period. Massachusetts has complied with this requirement.

7. On page 1-28 it is said that "detention-chlorination facilities, combined with an EPA-financed MDC destratification project in the Charles River Basin, will have a result heretofore not believed possible. They will result in even poorer quality water in the Basin than there is at present." This statement is not true. The combined sewer abatement projects will greatly reduce the overflows of untreated combined sewage and the destratification project has been operating successfully for several months, including the warm summer months.

8. It is true as ERT has indicated on page 6-1 that little water quality sampling was done during the development of the EMMA paln. However, the EMMA study was based in part on water quality studies of the Charles, Mystic and Neponset Rivers done by the Division of Water Pollution Control in 1973, and surveys of Boston Harbor by the New England Aquarium in 1972 and 1973. Harbor and tributary quality surveys were also conducted in the 60's.

9. On page 7-5 the ERT report questions the validity of designing combined sewage relieve based on a statistical design storm. I believe the design storm method of sizing combined sewage relieve sewers and treatment facilities is an appropriate and valid method

10. In reading Chapter 9, it appears the consultant only considers water quality benefits when a quality suitable for swimming is achieved. The report does not include benefits that may occur from incremental water quality improvements such as restoring or improving an existing fishery to a waterbody.

11. I fail to see how intensive urban street sweeping produces air quality benefits as indicated on page 10-4.

In summary the ERT report discusses some important issues that need to be addressed to improve Boston Harbor water quality. Most of these issues are being evaluated since the publication of the EMMA report. Because the report was not up-to-date and contained many errors and personal biases, it is of little value in influencing issues of national and regional importance.

Additional Comments

ERT Report

To the extent that the report suggests and contributes to improved water quality studies and evaluations we are in support of many of the recommended items.

The report sets forth numerous conclusions and recommendations for which there are not and substantive analytical backup. Many points are based upon subjective judgments and assumptions which cannot be scientifically supported or rejected. The report does not acknowledge that numerous aspects of the report are currently in developmental stages.

As an example, the Charles River Basin destratification project is projected to result in the release of large amounts of hydrogen sulfide gas. The project has been in operation for a number of months and the predicted problems have not occurred.

The assertion that water quality benefits accrue only when there is a major change in water use does not appear to be consistent with the National policy to move in progressive steps towards achievement of water quality objectives. In this same context the report does not recognize the benefits of achieving water quality objectives most of the time and only provide recognition of benefits if the water quality levels are achieved continuously.

Urban Systems

We agree with most of the recommendations contained in the report, however, we believe the report generally sets out "what should be" rather than "what can be." The report does not factor in financial resources, existing laws and legal providions, institutional relationships, etc. These represent the limiting factors which realistically prevent the recommendations of the report from occurring at the present time. ①

RESPONSE TO COMMENTS BY
WILLIAM J. BUTLER

1. Since the report was specifically directed at the effects of changing the regulations and laws, we thank you for your support. We have attempted to look at "what can be" given shifts in the Federal posture, but whether we have done so is, of course, a matter of individual opinion.

Comments on

"An Analysis of Water Quality Goals and Objectives
In the Boston Metropolitan Area"
Document P-2764
Draft Final Report
December 1977

by J. D. Smith, Environmental Research
and Technology

Prepared by Allen J. Ikalainen, Systems Analysis Branch
EPA - Region I

Page	Comment
1-2	Last paragraph - first sentence — Comment on water quality and fishing is not entirely accurate. Fishing occurs on the Charles River above the Watertown Dam to the source of the river. Warm water fisheries (bass, pout, etc. are caught and fishing is active). Information comes from observations along the river and discussions with people who fish the river.
2-3	Last sentence under Part 2.4 — Does Biochemical Oxygen Demand, as used here, include nitrogenous demand as well as carbonaceous? It should and should be explained as such.
2-3	Part 2.5 — Empirical models are representative of the data that was used to develop them and as with all other mathematical models should be calibrated and verified with independent sets of data, excluding the data used to develop them. To what extent was this done in the report and what are the specific data limitations for each model.

3-3 Quotation — Technology limiting exceptions may still apply.

3-16 Part 3.3.1 — Water uses such as bathing may be limited by "conditions resulting from natural origins." It is incorrect reasoning to set criteria for uses which do not account for such conditions. The Charles River is an example in which it is desirable to set standards so the water is not a public health problem when used, but it may not be so desirable to attempt to have water appealing for swimming in the wetlands and swampy reaches of the river where natural conditions prevent swimming.

3-20, 21 Table 3-7

The recommended criteria for nutrients - 25 ug/1 of chlorophyll -a relates only to the standing crop of plankton. How does this relate to rooted aquatic plants? Will phosphorous and nitrogen available after institution of the recommended controls be sufficient to support plant growth?

PP 3-18 Recommended criteria for fecal coliform bacteria — time spacing between the 5 sample sets should be specified.

PP 4-1 Controlling Water Quality Parameters

Selecting a controlling parameter for each water body infers that other parameters need not be evaluated. It would be reassuring if all pollutants causing problems were evaluated and if recommended controls were demonstrated to consistently and reliably handle those pollutants assumed away in the analysis.

Village USGS gauge. Thus the model is calibrated to represent pollutant distributions in the river at measured flow conditions.

The suspicion of low phosphorus loadings as reported by MDWPC for upstream treatment plants may arise in part from a decay rate which is too high and phosphorus from other sources such as sediments and unaccounted for non-point sources.

PP 6-6, Table 6-1

The title of this table indicates that the model was only run for one day of the four days for which there are phosphorus data (6/26, 28 and 9/4, 6, 1973). The September data for 1973 indicate that phosphorus fluxes in lower river reaches (above Watertown Dam) increase at downstream locations (r.m. 18.3 vs. r.m. 12.7) and, therefore, a decay coefficient of 0.1 day^{-1} is not appropriate. This means that phosphorus modeling is extremely complex and simple empirical models may not be representative or usable for assessing control strategies.

Part 7 Discussions under this section should include information on how management and operational skill intensive each control is. In considering a pollution control alternative such as sewer flushing and intensive street cleaning, the details of implementing the control should be part of the alternative evaluation phase.

PP 7-1 Last paragraph — The discussion of chlorination practices is well taken. Effects of chlorination on biota receive little attention by all involved in water quality planning in the

Metropolitan Area. This issue needs probing.

PP 7-2 Can we have some information on documentation of "increasing observations of tumors in fish and shellfish from waters receiving chlorinated effluents"?

PP 7-5 Last paragraph — It is good to see this approach applied, but the last sentence is misleading because there was only one application of a model which uses long-term precipitation records. That occurred in the Storage/Treatment Optimization for Storm/Combined Sewers analysis and Appendix F indicates a 14-year meteorological record was used. How might such an analysis be affected by using 20 years or more of record as opposed to the 14 years used in the report?

PP 7-8 and 7-9

The discussions of Automated Sewer Flushing and Street Cleaning should emphasize they are new technology without sound information on costs, effectiveness, and feasibility. It would be more appropriate to recommend demonstration studies of these controls before offering them as a solution to water pollution problems. Looking back at page 7-6, the discussion of what was thought to be a solution for control of combined sewer overflows (Cottage Farm Station) may have proven otherwise after demonstration.

An unanswered question concerning sewer flushing is: What are the effects of the 3-5% sewage in the overflows that occur after the interceptor capacity is exceeded. Will solids, paper, etc. be visible at the overflow point? Will each overflow need a mixing zone. These are real concerns which cannot be answered by modeling--a large scale long-term (1 year) demonstration is needed.

PP 8-20 Last sentence — This sentence leads to the conclusion that separate urban stormwater runoff by itself will not cause coliform concentrations to exceed standards in all areas of the harbor. This conclusion is based on modeling which considers large areas of the harbor and instantaneous, continuous mixing of runoff and pollutants. However, what happens in the nearshore zone from the land-water point to 100 feet off-shore? Won't suspended solids be visible and coliform concentrations be high in this zone of high water visibility and contact? Should planning consider extension of storm drains to deeper water some distance offshore?

PP 8-24, 1st Paragraph top of Page

This paragraph indicates the unknowns concerning street cleaning. Cleaning frequencies are highly variable as estimated and are not demonstrable by actual practice. Note that vacuum equipment at a cleaning frequency of once per day is assumed in the analysis of costs of controls.

Equipment costs are based upon vacuum equipment but none exist (pp. 7-9) which can work between and under parked cars. Therefore, how meaningful are equipment costs. Also, how were costs for equipment developed as related to miles of gutters to be cleaned?

Remainder of Section 8.3

This reads as though all of Metropolitan area will have streets cleaned daily. What are some other factors not mentioned which could affect such a control. Some potentials are traffic problems, parking needs, disposal of materials picked up--volume, disposal sites, etc.

8.4 Secondary Treatment at Deer and Nut Islands

The question of the need for Secondary Treatment in Boston Harbor may never be answered until we advance our understanding of the marine ecosystem and its long-term responses to urban wastes.

The chlorination point is well worth consideration if the model used to determine the impacts of secondary treatment is correct.

PP 8-35 Expand upon conditions under which Dissolved Oxygen will become the limiting criterion in the Inner Harbor.

Table 8-11 — Land costs at $2,000/acre are not reasonable, may be low by a factor of 5 or more. How would this affect cost/benefit analysis.

Note that land area required for Middle Charles and Upper Neponset plants are 7035 and 5675 acres, respectively. This should be clearly pointed out.

If land costs are low by a factor of 5, then land costs for Middle Charles and Upper Neponset land treatment plants sites would be $70.3 million and $56.75 million. This would increase total capital costs to $104.32 million and $84.93

million, respectively. These are more than double EMMA comparable costs. Will the capital cost differences negate land treatment under 77 FWPC Act Amendments (15% factor increase over conventional methods).

Furthermore, I doubt if there are open land areas of the proper type available such that 7,035 and 5,675 acres could be devoted to land treatment.

Table 8-12 — Land area required equals 12,710 acres. If land application schemes with return flows to rivers were considered, effects upon Dissolved Oxygen in the rivers would need to be investigated.

Other considerations involving land treatment are duration of effectiveness of land treatment sites. Do sites have a limited period for treatment. What would be the costs of abandoning existing treatment facilities? Has land area required for 5 month storage lagoons been considered in land treatment costs? A total of 2.58 x 10^4 acre feet of storage would be required at the end of the 5 month storage period.

PP 8-38 Last paragraph

I doubt if assumption of zero non-point source contributions to Charles River at low flow and the resulting effect is correct. The reason is that low flow conditions will be affected by phosphorus and nitrogen in the river system which has not passed out of the system. At low flow the time of passage through the entire river from Milford to Watertown is many weeks. Low flows will not last many days and thus the river will almost always be carrying some nonpoint source loadings.

PP 10-1 Second paragraph — Reference to (Horowitz and Bazel) is not in the list of references.

The discussion of Section 10.1 is not entirely accurate. The limiting factors in water quality planning and management are resources and time for data collection and analysis versus legislated deadlines for commitment of funds to meet public demands. Also it is no doubt true that the scientific and engineering understandings of water pollution processes have not been incorporated into the planning process fast enough. However, it is also probably true that discoveries in the field have also moved ahead too slowly as compared to the public demand for clean water.

PP 10-2 Last paragraph under Section 10.1

The comments on SWMM are out of date. SWMM will simulate long-term rainfall and any control device which can be suitably programmed.

The discussions in Part 10 ignore a fact of life—it is time. The technology for combined sewer, urban runoff and non-point source pollution control is developing now. It is more advanced today than when EMMA began. Many of the control methodologies recommended in the report are not proven and have not been demonstrated in any real-world situation. The ongoing facilities planning is supposed to seriously consider alternative controls. Water quality management planning today (Phase 2 Basin Plans) will include urban runoff, non-point source and combined sewer overflow assessments and controls. Data collection and analysis will support the planning, i.e., Charles River Survey of 1978.

Appendices

Appendix A is not applicable any longer.

Appendix D

D. 1. How was the rate constant of 0.1 day^{-1} developed?

PP D-2. Was computation and comparison done for Sept. 1973 data as well? If not - why not? Wouldn't this tell more about model's ability to accurately represent phosphorus fluxes.

PP D-2. Next to last sentence — sampling by EPA and DWPC was done during three one-to-two-week periods in 1967 and 1973 and and is not two years of sampling. Was PRI sampling done over several days, weeks, months?

PP D-7. Parameter values of a_N and a_P are from Potomac River estuary. What is available for information to indicate these are representative of the Charles River?

It appears that the model does not account for phosphorus sources such as precipitation or uptake from sediment. It has been shown that total phosphorus is transported by a deposition-resuspension process in rivers. Thus the phosphorus model may not account for all phosphorus in the river system and control strategies based upon it may not prove to be as effective as assumed.

In Section 5.2, pollutant loadings are expressed as pounds/acre-year and pounds/capita-year. Loadings distributions in Tables 5-1, - 6 are expressed as pounds/day. In Appendix D, M_p and M_{np} are phosphorus loadings in pounds/day.

What was the procedure for daily loadings distributions development? Elaborate on this explaining the real-world stochastic nature of loadings from runoff and non-point sources vs. the procedure used.

Was the Charles River Model adapted to simulate BOD and coliforms in the river and is this how the loadings in Tables 5-1, 5-3, 5-4, and 5-6 were developed?

Appendix F

PP F-1 Specific input conditions for the model were So. Boston portion of ERT Dorchester Bay Model?

F-9 Figure F-1 is confusing.

Appendix G — Automated Flushing of Combined Sewer Systems

Where is flushing effectiveness analysis & the problem treatment. Apparently pollutant reductions are assumed & applied as such in Chapter 8.

Appendix H — Table H-1 - might be a question if this effluent and pollutant conc's would meet water quality standards.

Appendix I. — GOOD, but clean water perceptions vs. realities may be a problem.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: October 17, 1978

SUBJECT: Boston Harbor Case Studies

FROM: Wallace E. Stickney, Director
Environmental & Economic Impact Office

TO: Kenneth L. Johnson
Special Representative

These comments first address the sludge management EIS separately from the upgrading EIS, then discusses some inconsistancies in the NSF call for alternatives comparisons in each.

A. Sludge Management EIS

The sludge management EIS was initiated at the traditional time--at the end of the facilities (or at that time, preliminary) planning process. ① On page 128 the USRE Institutional Aspects of Wastewater Management report observes that the EIS considered a number of alternatives not considered in the Step I planning and modified the pre-existing ones significantly. The EIS effort included a sludge marketing study and reviewed alternatives more rigorously than the Havens & Emerson report; NEPA requires this be done. EIS's are not useful and time is wasted if the EIS is done only on those alternatives set forth by the applicant. Nor would such an EIS comply with NEPA. On the other hand, the NSF reports are critical of the upgrading EIS for limiting the range of alternatives.

The responsibility for the initiation of the co-incineration ② should be clarified. As far as we know, it was initiated by EPA DRA Ken Johnson, not the state.

B. Wastewater Management EIS

The EIS was initiated as early as possible in the process (p. 105) simply because all the regulations and guidance espouse beginning ③ EIS's early — and we agree. As a large, expensive and controversial project, there was no doubt that an EIS would be required at some point in the process.

The EIS effort did not include ocean disposal of sludge and primary treatment because they are more than "...those not within the ④ authority of the originating agency" (p. 107); actually these are illegal. We could not fund the MDC to study these under our ordinary 201 process.

While land disposal was discounted early, the EIS was not merely ⑤ an adjunct to facilities planning although many EIS preparers wish that the EMMA plan had included more information (conclusion p. 11, 105, 128, 129). The EIS focuses on the decision of satellite plants vs. the all harbor concept. This is a broad policy decision which must be made before detailed facilities planning is initiated. However, to do so without knowing in a general sense, what the impacts of various alternatives (or indeed if they are real alternatives or "straw man" alternatives) some preliminary evaluations must be made. Hence the review of the effect of satallites on river quality, and broad comparisons with all harbor plans and sites. There is no question that this is the major system alternative decision. In addition, 12 sets of alternatives were reviewed in drafting the EIS. There is no question that more detailed facilities planning will be required and that the final EIS's (probably published on portions of the project) will await more planning.

⑥ There appear to be some inconsistencies in the NSF report regarding the appropriate range of alternatives. The sludge EIS is catagorized as reviewing two broad a range of alternatives and the wastewater management EIS as being too limited. The proposed CEQ regulations which require "concentration on the most significant impacts" are also cited (p. 102).

⑦ As noted previously, we do not agree with these assessments, but if the NSF does it has a wide range of approaches from which to chose in recomending an appropriate course of action but it does not do so. Piggybacking really is a process recommendation. The appropriate range of alternatives must be determined even with the piggyback process. We should have more guidance on the appropriate level of alternatives.

RESPONSE TO COMMENTS BY
WALLACE E. STICKNEY

1. The key comment is that "EIS's are not useful and time is wasted if the EIS is done only on those alternatives set forth by the applicant. Nor would such an EIS comply with NEPA." This comment seems to us to say that EPA expects the applicants to look at a more limited range of alternatives than would be environmentally sound, and such a posture supports our comments made in the text.

2. Thank you; the text has been modified accordingly.

3. We agree that EIS's should be initiated early in the process, but only question initiation of the EIS preceding facility planning, since the step 1 plan should also be initiated early in the planning process.

4. The question here is whether to include actions which could not be implemented under Federal law as a subset of "those not within the existing authority of the responsible agency." The point made by EPA in the comment seems to be that actions which are illegal only under state or local law should be considered in the EIS, while those which are illegal under Federal law should not. We disagree.

5. The EIS was specifically stated by EPA officials in the interviews to be primarily an exercise in facility planning, and we believe that that has been its major result. Since the comment states that it "focuses on the decision of satellite plants vs. the all harbor concept," we believe that our point is confirmed, particularly since the facility planning includes environmental review.

6. The wastewater management EIS was characterized as being too narrow only in its decision that the "major system alternative decision" discussed above was limited to satellite plants or all harbor. With respect to issues such as plant location, it is sufficient in its consideration of alternatives.

7. We agree that it would be useful for EPA to provide, at the national level, more guidance as towards both the process of EIS preparation, and the appropriate level of alternatives to be considered. At present, the only guidance is in the term "feasible", and this could be improved. We have included this recommendation in the body of the report.

PRESENTED BY DEPUTY REGIONAL ADMINISTRATOR SEPTEMBER 27, 1978

EPA STATEMENT ON NSF BOSTON HARBOR STUDY

Region I of the United States Environmental Protection Agency welcomes this opportunity to comment on the draft case study reports of wastewater management in the Boston Metropolitan area, prepared under the direction of the Council on Environmental Quality, the National Science Foundation, the Office of Management and Budget and EPA itself. The opportunity to comment allows Region I to discuss in detail the bases for its efforts over the years to improve wastewater treatment in the metropolitan area.

EPA's Boston Harbor Record

Even before EPA was created in 1970, its predecessor Federal water pollution agencies in Region I were deeply involved in working toward better Wastewater Treatment for Boston and its outlying communities, but it was not until the Federal Water Pollution Control Act of 1972 that there was both sufficient Federal regulatory authority and financial assistance to assure wastewater cleanup activities on the scale required. The basic direction and force of EPA's current water pollution control activities were established by the mandates of the 1972 Act, and have been continued under its amended 1977 version.

In both the Federal Water Pollution Act of 1972 and its successor Clean Water Act of 1977, the Congress stated that its objective was to "... restore and maintain the chemical, physical, and biological integrity of the nation's waters..." The lawmakers also declared national goals to completely eliminate the discharge of water pollutants by 1985 and to achieve wherever attainable an interim water quality objective that would allow fishing and swimming.

The Congress bolstered its statements of objectives and goals with national policy commitments designed to foster water pollution control progress.

As far as Boston Harbor is concerned, two of the most important of these involved declarations that: (1) The discharge of toxic pollutants in toxic amounts was to be prohibited, and (2) Federal financial assistance was to be provided for the construction of publicly owned treatment works.

What impact have these objectives, goals and policies had upon Boston Harbor and the quality of wastewater discharged into it? To answer that question, it is best to separately examine each basic pollution source category that affects the harbor and its tributaries. There are three of them: The never-ending outpouring into the harbor of human sewage and sewered industrial wastes, the intermittent overflows from combined storm and sanitary sewers during storms, and the urban wastewater run-off through storm sewers during periods of precipitation. Each of these basic pollution sources will have to be controlled effectively if there is to be fishing and swimming throughout the harbor and in the lower Charles, Mystic and Neponset rivers and ---certainly---if the Congressional goal is to be met and if discharge of water pollution into Boston Harbor and its tributary rivers is to be eliminated.

The largest and most continuous discharge of pollution involves the outpouring of partially treated human sewage and sewered industrial wastes. Data from the year 1976 for instance, shows that an average of almost 400,000 pounds of organic sewage as measured in terms of biological oxygen demand was discharged daily into the harbor from the Metropolitan District Commission's Deer and Nut Island primary treatment plants, alone. Since those plants provide the same level of treatment in 1978 that they provided in 1976, it is probable that at least the same quantity of human sewage is discharged today. This great quantity of organic sewage becomes even greater when the amount of MDC wastewater treatment process sludge, also routinely dumped into the harbor, is addid to it. Each day, more than 100,000 pounds of sludge is released in Boston Harbor.

A great quantity of other pollutants are also introduced into the harbor along with the degradable human organic wastes from the treatment plants. In total, for the same year of 1976, over 20 million pounds of oils and greases and almost 2 million pounds of heavy metals were dumped into Boston Harbor through the Deer and Nut Island outfalls.

During normal operations, the discharge of degradable organic sewage through the treatment plant outfalls does not result in the violation of the traditional sanitary engineering water quality standards for dissolved oxygen, suspended solids and fecal coliforms. It is not likely that fish will die from the depletion of oxygen in Boston Harbor owing to the degradation of organic material discharged from Deer and Nut Islands, and it is equally unlikely when the plants are in operation that the treatment plant effluents will contribute to the transmission of communicable disease. It must be emphasized that continued compliance with the traditional water quality standards is very much dependent upon the quality of operation and maintenance at the Deer and Nut Island facilities. Nut Island, in particular, has experienced operational breakdowns in the past which have resulted in the closing of beaches and shellfishing areas.

In spite of the apparent adequacy of the existing MDC treatment facilities for meeting the traditional standards for water quality in Boston Harbor, the Environmental Protection Agency has insisted that the level of treatment be upgraded. Specifically, EPA has required that MDC meet the criteria for secondary treatment which have been enforced as the minimum acceptable level of treatment technology for all publicly owned wastewater treatment facilities across the nation.

Why, since the historic purpose of "secondary" treatment has been to address those dissolved oxygen, suspended solids, and similar pollution parameters already controlled at Deer and Nut Islands, has EPA insisted that the Metropolitan District Commission plan and construct secondary treatment facilities? The answer lies in the recognition by the Congress, when it was drafting the 1972 Federal Water Pollution Control Act, that the traditional water quality standards were only as good as our admittedly imperfect understanding of the harm that could be caused by the presence in our nation's waterways of specific pollutants in specific concentrations. In light of our imperfect understanding, allowing water to be polluted up to the levels of the standards constituted the acceptance of a significant risk to the environment. It was also recognized that the traditional standards covered only a fraction of the adverse effects that might be produced by the full spectrum of water pollutants. The Congress, reflecting the general anxiety of the American people, worried that the presence of little understood, toxic, materials in rivers, lakes and marine waters might severly impact acquatic life and might bring harm to human beings as well. It was determined that it would not be wise to hold up the application of available, practical, controls pending the conclusion of research to fully identify all pollutants and all possible adverse effects.

Thus, was born the Federal Water Pollution Control Act provisions requiring the universal application of "best practicable technology" for industrial point sources, and "secondary treatment" for publicly owned discharges. The 1972 Act specified that these treatment levels were to be achieved by 1977. Most industries across the country have been able to meet the 1977 discharge requiremnt, and the majority of municipalities have either installed secondary treatment facilities, or are well along in planning, design, or construction.

These requirements of the 1972 Federal Water Pollution Control Act meant that the Metropolitan District Commission could no longer discharge wastewater from Deer and Nut Islands after only primary treatment to remove settleable solids. Secondary treatment would be required, and this was made official on August 12, 1976 by a National Pollutant Discharge Elimination System discharge permit jointly signed by EPA and the Commonwealth of Massachusetts. The permit included a compliance schedule that specified the installation of secondary treatment facilities by 1985.

Very importantly, the permit also established requirements for minimizing the discharge of toxic materials into the sewers of the metropolitan area. A survey of all know major contributing industries was ordered, and the permittee, the Metropolitan District Commission, was required to set up a fully staffed industrial waste section in order to implement sewer use regulations and industrial pretreatment programs.

Finally, with regard to the treatment of sewered wastewaters, the August 1976 permit required that action be taken so that there would be environmentally sound disposal of the sludge removed as a result of the treatment process. Historically, not only has the wastewater from the primary treatment process been discharged into Boston Harbor, but so has been the sludge removed in the treatment process! The permit ordered that new facilities for the disposal of primary sludge be in place by 1980. A satisfactory disposal system for secondary treatment process sludge was to be operational by 1985.

The permit also directed that work be undertaken to minimize pollution resulting from combined sewer overflows, the second pollution source category of importance to Boston Harbor and its tributaries. These overflows pose a serious and immediate threat because, unlike the discharges from the Deer and Nut Island outfalls, they result in the violation of official water quality standards. In particular because the overflows are not disinfected, the fecal coliform standard is typically exceeded. Since the presence of fecal coliforms indicates the likely presence of pathogenic organisms, the overflows must be considered a means for the transmission of human communicable disease. The threat of human exposure is pronounced, because the overflows involve river and inner harbor locations, and not remote outfalls. The 1976 NPDES permit established compliance schedules for the correction of all known major overflow problems affecting Dorchester Bay, the Charles River, the Neponset River, and the Boston Inner Harbor including the tidal portions of the Mystic, Charles and Chelsea Rivers.

The NPDES permit followed the main recommendations of the Wastewater Engineering and Management Plan for Boston Harbor, the so-called EMMA study plan, but it also incorporated specific measures through which the basis for the recommendations would be tested and thorough cost-effectiveness analyses would be applied to each of the apparently feasible waste treatment alternatives. These specific measures had their origin in the sections of the 1972 law that described requirements that must be met by municipal wastewater treatment authorities applying for financial assistance to construct treatment facilities. 75% of the construction costs for treatment facilities needed in the Boston Harbor cleanup will be borne by the Federal government. This will ultimately involve hundreds of millions of dollars.

The first of the Federal financial assistance requirements, which were incorporated in the permit as enforceable provisions, required the MDC to conduct an Infiltration/Inflow analysis of the sewer systems discharging into the Nut and Deer Island treatment systems. The results of this analysis would be used in the determination of the size of the treatment facilities that would most cost-effectively serve the needs of the metropolitan area. If the analysis showed that repairing leaks into the treatment system would be less expensive than constructing a treatment facility large enough to handle the leakage, EPA would award grant money for the repairs, rather than building additional treatment capacity.

The other important specific measure involved the requirement for "facilities plans" to be prepared for each of the wastewater treatment construction projects required for Boston Harbor and its tributaries. The facilities plans were to be prepared for both ultimate treatment upgrading, and combined sewer overflow projects. Based upon EPA's construction grant regulations, grants are not to be awarded until, "...alternative waste management techniques have been studied and evaluated and the works proposed for grant assistance will provide for the application of the best practicable waste treatmennt technology over the life of the works..."

By EPA regulations, facilities plans must include an assessment of the expected environmental impact of the facility for which construction grant is requested. When the potential impact may be important, EPA itself is required by the National Environmental Policy Act to prepare an Environmental Impact Stetement. Usually, EPA does not decide whether an EIS will be required until after the grant applicant has completed the facilities plan. In the Boston Harbor case, the scope of the cleanup program alone made the decision to prepare an Environmental Impact Statement a foregone conclusion. As a consequence, the Environmental Protection Agency began its EIS work on the overall Boston Harbor Project in early November, 1976. It was the agency's expectation that early preparation of the statement, with the full cooperation of the Metropolitan District Commission, would result in the earliest selection of environmentally sound project alternatives. The Draft EIS, which is now (1) out for public review addresses the facilities needed for upgrading to secondary treatment, including ultimate disposal of the sludge.

At an earlier date, in 1975, EPA began the preparation of an Environmental Impact Statement for disposal of sludge from the existing Deer and Nut Island treatment facilities. This EIS was deemed necessary because any currently known sludge disposal practice has at least some environmentally undesirable features. The Final sludge disposal EIS is now essentially complete.

EPA and MDC have worked closely together since the NPDES permit was issued in August 1976. Facilities planning grants for combined sewer overflows, throughout the harbor area, were awarded during the past spring and summer, and facilities planning for the secondary treatment projects will begin shortly.

It is likely, however, that facilities planning for the secondary treatment projects will be directly affected by an important new provision of the Clean Water Act of 1977. This new provision allows a modification of the secondary treatment requirement for coastal communities if those communities can demonstrate, essentially, that: (1) Aquatic life will be protected and full recreational uses of the receiving waters will be possible, (2) Applicable water quality standards will be met, and (3) Pretreatment requirements will be enforced for sources discharging into the public treatment works. Communities desiring such a modification must apply for a waiver of the pretreatment requirement. Under the law, it is the right of the Metropolitan District Commission to submit a pretreatment requirement waiver application. It is the responsibility of EPA to make its decision expeditiously on any such application.

The preceding material has been a summary discussion of the basis for the Environmental Protection Agency's efforts over the years to improve wastewater treatment in the Boston Metropolitan area. As a result of the NPDES permit, and construction grant, authorities of the 1977 Federal Water Pollution Control

Act, it has set in motion---with the Metropolitan District Commission---large scale projects to upgrade its present wastewater treatment facilities, and to minimize its combined sewer overflow problems.

It must be admitted that stormwater sewer discharges, the third major pollution category affecting Boston Harbor, have not received the degree of attention given to sewered human and industrial wastes and to combined sewer overflows. There has been no Federal construction grant assistance for this category and, although a start has been made in the planning for stormwater controls, much work remains. It will be necessary for the agency, in the immediate future, to devote serious attention to this remaining problem and to its solution. In all frankness, however, it must be recognized that the facilities required for human sewage and sewered industrial wastes, and for eliminating combined sewer problems, will consume all of the presently authorized Federal construction grant funds available for metropolitan Boston.

Major Comments on the Case Study Reports.

In view of the long term and deep Environmental Protection Agency involvement in wastewater management for the Boston Metropolitan area, as discussed in the preceding section, how does the agency assess the draft case study reports? The response must be a mixed one, with both positive and negative elements. If all of these elements were to be summed up in a single overall EPA conclusion, the conclusion would be that the studies include many intelligent analyses but that the passage of time and events had made obsolete much of the information upon which the analyses were based.

The prime example of how time and events have changed the information base used in the case studies concerns the heavy emphasis placed in the studies upon the conclusions and recommendations of the Eastern Massachusetts Metropolitan

Area, or EMMA, plan. The Environmental Impact Statement analyses recently performed by EPA have already established significant new conclusions differing from those of the EMMA plan, and it is likely that the results of the Metropolitan District Commission's Infiltration/Inflow investigations and facilities planning---now underway---will produce more changes. In spite of this fundamental work, post-dating the EMMA report, the case study entitled An Analysis of Water Quality Goals and Objectives in the Boston Metropolitan Area treats the old EMMA recommendations as if EPA and MDC were permanently committed to them. This conclusion must be challenged by EPA because, while the EMMA plan provided an initial framework for further planning efforts. those planning efforts have already caused changes. The following specific points should be made.

1. The findings are based on the assumption that the EMMA Recommended Plan will be followed verbatim without any further study. This assumption is not at all representative of what has taken place and what will take place. This Agency will invest upwards of $10 million simply to re-evaluate and refine the recommendations of the EMMA Study. We have already given the MDC a grant for $3.5 million to study the combined sewer overflow problem in Greater Boston. An EIS that is being done by EPA on certain portions of the EMMA plan has come up with some preliminary recommendations that agree with certain recommendations of the Water Quality Goals and Objectives Report. For example, our preliminary conclusion on the issue of satellite plants is that they will not meet water quality standards and have therefore recommended against them. We are by no means blindly following the EMMA Plan. The EIS analyses predated receipt of the case study reports.

2. The findings state that alternate methods exist for combined sewer overflow control that warrant further analysis. This is precisely what is routinely done in the facilities planning process. However, we must point out, as recognized in the case study, that many technologies that appear feasible in theory have yet to be proven or demonstrated on a large-scale basis.

3. The findings imply that the EMMA Plan in and of itself will prevent water quality standards from being met. We feel that this is an unfair representation. If one reads beyond the EMMA Reports' Executive Summary, one will find that the point being made is that unless urban runoff is controlled, standards will continue to be violated. The impact of urban runoff is a recently-emerging National issue that requires a lot more research. However, we believe that provision for secondary treatment of dry weather flows and effective control of combined sewer overflows will bring significant reductions in the current pollutant loadings. We believe that these controls are a necessary component of any overall water quality management plan.

4. Another prediction by the case study drafters that led to the statements on water quality degradation was that an EPA-funded destratification project on the Charles River Basin would cause severe hydrogen sulfide (odor) problems and resuspend toxics pollutants throughout the basin. This project has been in operation a few months and we are pleased to report that except for on the first day of operation the hydrogen sulfide levels have been below detectable limits. The dissolved oxygen, which once was zero, is now 5 MG/L on a consistent basis. This level of D.O. is capable of supporting a diverse population of fish. Measurements of turbidity and plankton have not shown significant increases.

We would like to make a point or two about the other reports:

1. The main thrust of the Wastewater Treatment Facilities Planning Case Study Report seems to be that the EMMA recommended facilities are grossly oversized

and the CSO options employ ineffective control techniques. To these points we will just reiterate that detailed facilities planning is now underway, as required by EPA's long-standing regulations, in which process the sizing and effectiveness of a wide variety of alternating will be closely examined. This effort has already begun on the combined sewer overflows projects. We would also like to point out that this report reflects the Boston situation as of January 1, 1977 - some 21 months ago. Since that time, Infiltration/Inflow analyses of the MDC system have been done, a $5 million CSO Facilities Planning effort has been initiated and a draft EIS on some of the major components of the EMMA Plan has been completed.

2. A key issue raised in the Sludge Case Study Report was that ocean disposal of sludge in the Boson area is a potentially cost-effective solution that should be given more consideration. Under Federal Law ocean dumping of sludge is prohibited after 1981. The case study writers apparently feel that the law should allow more flexibility on a case-by-case basis. This national issue is one that has been decided by the Congress, speaking for the American people. It is clear that the national consensus is that the oceans should not be used as a dumping ground, no matter how convenient. EPA must enforce the laws it is given responsibility for administering, and the agency does not intend to make an exception with regard to the legislative prohibition on continued dumping of sludge.

3. The case study report entitled Institutional Aspects of Wastewater Management is critical of the fact that the Section 208 area-wide waste management planning effort in the metropolitan area was not designed to produce a comprehensive plan of action for cleaning up Boston Harbor. In this regard, it has been EPA's position that the Section 208 effort should not attempt to redo effective earlier planning work, but should be designed to complement that work. It is the agency's belief, for example, that earlier area-wide planning fully justifies ②

the facilities planning now in progress. The existing combined sewer overflow problems of the metropolitan area do not require further area-wide planning but, rather, planning directed toward the application of cost-effective solutions. In taking this stand, EPA recognizes that planning, both area-wide and on a local basis, must be a continuing process which provides for periodic reexaminiations to test existing plans in the light of new information.

National Issues

In addition to the national issues already mentioned, the case study reports included other recommendations that require new Congressional actions, or basic changes in overall EPA policy. One of these recommendations, for example, involved Federal financial assistance to pay for the costs of operating and maintaining publicly owned wastewater treatment facilities. Historically, it has been the position of the Congress and EPA that the day-in and day-out costs of wastewater treatment should be borne by those who generate the wastes. That position has not changed, It is true that Federal assistance has been authorized for the construction of treatment works, but that the construction grant program has always been intended as a temporary effort to help with the extraordinary, one-time, capital costs of upgrading the nation's municipal waste treatment capability. ③

Other national program recommendations involved an expansion of research and development efforts, and increased attention generally, to combined sewer overflows and to stormwater, or urban runoff, controls. The Clean Water Act of 1977 requires that EPA report to the Congress by October of this year, regarding combined sewer overflows, and it is clear from report drafts in preparation that the agency on a national scale seriously intends to give greatly increased attention to combined sewer problems. A variety of legislative alternatives will be discussed in the report to the Congress, including a separate multi-billion dollar construction grant authorization for combined sewers, and financial assistance for non-structural solutions. The draft report discusses analyses made of some of these non-structural solutions, including the sewer flushing alternative recommended in one of the case studies. The results of these analyses, as reported, allow a comparison of estimated costs and pollution removal efficiencies among the various combined sewer overflow solution alternatives. Although the analyses appear to indicate that overflow storage and treatment can achieve greater pollution reductions at costs equal to or less than sewer flushing alone, it is the expectation of EPA's Region I that a combination of the two alternatives will prove to be the most cost-effective.

This brief discussion of EPA's combined sewer overflows activities should not be ended without mentioning the research and demonstration work that the agency has already conducted. EPA has obligated over $45 million, for combined sewer overflow demonstration projects, and the results of these demonstrations will be seen in future CSO projects across the nation.

Not as much has been attempted for stormwater controlls although the program is beginning to expand. It is the agency's intention to earmark 20 to 30% of its available Section 208, area-wide waste management planning, funds for stormwater problems in 20 to 30 urban areas. From this planning effort, a national assessment of stormwater issues will be made, and future control programs will be designed.

The need to accelerate pre-treatment programs for sewered industrial wastes was also recommended in the case studies. On June 26, 1978, EPA published its pre-treatment program regulations in the Federal Register. It is expected that specific requirements for 21 industrial categories will be adopted by December 1979. As authorized by the Clean Water Act of 1977, industries discharging into municipal sewers must meet these requirements within 3 years of their adoption. It will be the special responsibility of the Metropolitan District Commission to establish and maintain an effective Boston Metropolitan area program for administering the Federal pre-treatment standards.

With regard to the case study recommendation that estimates of operating and maintenance costs include an acknowledgment of inflation and its impact, EPA's cost-effectiveness analysis guidelines are now being revised and some acknowledgment of inflation may be used to increase the current 6 5/8% annual discount figure used for estimating costs. Expected extraordinary increases in natural gas and land costs may be recognized. However, since the inflation rate is likely to fluctuate widely over the life of treatment works, it would be very difficult to assume an accurate value for inflation. (4)

Conclusion

To this point in EPA's statement of comments concerning the draft case study reports of wastewater management in the Boston Metropolitan area, there has been a discussion of the basis for Region I's longstanding efforts to improve wastewater treatment prior to discharge into Boston Harbor and its tributaries, and a discussion of the major issues raised in the case study reports, themeselves.

In conclusion, the Environmental Protection Agency wants to describe the specific nature of the on-going pollution control efforts for the Boston Metropolitan area.

First of all, with regard to the treatment of sewered wastes prior to their discharge through the Metropolitan District Commission's outfalls, MDC and EPA are now reviewing a consultant-prepared, draft, scope of work for the facilities planning required. Since the Clean Water Act of 1977 continues to require a minimum level of secondary treatment for publicly owned facilities, unless EPA approves a waiver of this requirement upon a demonstration by an applicant wastewater treatment authority that secondary treatment would not be cost-effective for a particular marine discharge, the scope of work is directed toward the planning of secondary treatment facilities for the metropolitan area.

Before approving any scope of work for the Metropolitan District Commission's secondary treatment facilities, EPA will insist upon an assurance that all viable alternatives be comprehensively evaluated during the facilities planning process. In this instance, the agency recognizes that the process must be flexible enough to address alternatives that might emerge from a future decision to allow a waiver of the current Federal requirements for secondary treatment. This flexibility could be built into the scheduling of the facilities planning work which is to be carried out. In order to avoid any wasteful duplication, of course, the agency expects that the MDC's consultant facilities planners will build upon the analyses of basic treatment alternatives that were produced during EPA's recent preparation of a draft Environmental Impact Statement addresse to the collection, treatment, and disposal of sewered wastes in the metropolitan area. This draft EIS concludes that secondary treatment would be accomplished in the most cost-effective and environmentally sound manner if the treatment facilities were concentrated on Deer Island. The conclusion follows from a detailed analysis of a variety of alternatives, including the alternative recommended in the EMMA plan. The EMMA recommendation, in addition to secondary treatment plants at both Deer and Nut Islands, included a provision for two satellite facilities at inland locations. Because these satellites would discharge their treated wastewaters into the limited assimilative capacity of inland streams, the EMMA plan recognized that advanced waste treatment——beyond secondary treatment——would be needed. To cite yet another example of how the EMMA recommendations have been reexamined, based upon the Environmental Impact Statement analyses, EPA has determined that water quality standards would not be met under any feasible combination of degree of treatment and discharge location for the proposed satellite plants. As a consequence, it is the agency's opinion that the satellite treatment plant alternative does not justify further consideration.

The analytical process which formed the basis upon which EPA's Environmental Impact Statement recommendations have been established also addressed the question of the ultimate disposal of sludge removed during the primary and secondary treatment processes. In accordance with the recommendation of the separate EIS that addressed the disposal of primary sludge, the agency has concluded that the incineration of primary sludge at Deer Island, with the residue ash remaining on the island, would provide the least environmentally objectionable means for sludge disposal. For secondary treatment process sludge disposal, EPA's recommendation involves a combination of incineration at Deer Island, and landfilling and composting at Squantum Point.

Beyond a proviso that it will not approve grant funds for MDC facilities planning that unnecessarily duplicates the analyses performed during the Environmental Impact Statement preparation process, EPA will strongly encourage facilities planning that examines all feasible alternatives. It is the goal of the Environmental Protection Agency, as it is of the Metropolitan District Commission, to assure that the most cost-effective wastewater treatment is provided for the citizens of the metropolitan area. Neither of these agencies will be irretrievably bound to any past recommendations that were based upon information inputs which now may be outdated.

This same insistence upon a full evaluation of all available alternatives, also applies to finding solutions for the combined sewer overflow problems of Boston and its suburbs. In May and early June of this year, over 3 million dollars in EPA grants were awarded for combined sewer overflow facilities planning. The agency approved the grants after it was convinced that the scope of work: (1) Covered all problem areas of Boston Harbor and the rivers flowing into it, (2) Provided for a detailed characterization of problems experienced at each and every overflow point, and (3) Examined all feasible options for combined sewer overflow control. The in-depth and large-scale facilities planning described in the scope of work, and which is now underway, will require approximately two years for completion.

Because of the large capital costs associated with controlling combined sewer overflows with the usual methods of detention in large tanks with subsequent controlled release, it is certain that the combined sewer overflows facilities planners will investigate operational means to augment the usual means of control. One of these operational means involves sewer flushing, the method recommended in one of the case study reports. EPA has currently engaged a consultant to estimate the specific annual savings that can be gained if sewer flushing is practiced in the Boston Metropolitan area. If the estimate indicates that the savings may be significant, it is likely that the agency will---in the near future---support an MDC sewer flushing demonstration project. The project would be designed for completion in a short enough period of time so that its results could be used by the combined sewer overflow facilities planners.

It would be ideal if facilities planning for stormwater discharges was as far advanced as is planning for solutions to combined sewer overflow problems. This is not the case, however; only a small---although significant---beginning has been made. The Metropolitan Area Planning Council, with grant funding under the Federal Water Pollution Control Act's "Areawide Waste Treatment Management" planning authority, has completed a valuable survey of stormwater drainage throughout the metropolitan area. The development of this survey constitutes the first step toward the target of accurately assessing the stormwater problems of the area and devising solutions for them. The next steps should involve facilities planning but, whereas the availability of Federal construction grant funds currently gives impetus to facilities planning for the control of human sewage, sewered industrial wastes, and combined sewer overflows, today's pool of grant funds is not large enough to deal with the stormwater problems of the nation. Under any circumstances, stormwater treatment will be very expensive. For this reason, it is probable that there will be no more than slow progress in stormwater treatment for the Boston metropolitan area. EPA fully recognizes the importance of the stormwater problem, however, and Region I is committed to a course for producing cost-effective solutions. In this regard, the agency will require assurance that the current facilities planning work will provide for the future integration of stormwater controls.

The final item that bears discussion in the concluding section concerns the application of the Metropolitan District Commission for a waiver of the secondary treatment requirement of the Clean Water Act of 1977. Although an approved waiver would obviously affect the MDC's facilities planning now directed toward secondary treatment, this does not mean that the cleanup of Boston Harbor will be adversely affected. On the contrary, the waiver process itself is likely to be a very positive influence. To cite three significant requirements from the new law to indicate how this positive influence may work, it is required that applicants demonstrate (1) That its wastewater treatment waiver will assure the "...protection and propagation of a balanced, indigenous, population of shellfish, fish and wildlife, and allows recreational activities, in and on the water..," (2) That "...all applicable pre-treatment requirements for sources introducing wastes into such treatment works will be enforced..," and (3) That "...to the extent practicable, the applicant has established a schedule of activities designed to eliminate the entrance of toxic pollutants from nonindustrial sources into such treatment works..." If these three requirements are adequately addressed, planning for wastewater treatment to best serve the metropolitan area can only be enhanced——regardless of whether a waiver is granted. It can be expected that the MDC will make a substantial effort to meet these, and other, waiver requirements. It can also be expected that EPA will give the waiver application an unbiased and thorough evaluation.

In summary, it can be stated that the cleanup of Boston Harbor's water pollution is gathering momentum. Comprehensive facilities planning is underway to find cost-effective solutions for combined sewer overflows, and similar planning is about to start for the collection, treatment, and disposal of sewered wastes. When this planning is complete, design and construction of the necessary facilities will begin immediately. A small, but important, beginning has been made with regard to stormwater problems. Whether or not a secondary treatment waiver is granted, serious attention will be devoted to the control of toxic chemicals discharged into the harbor.

There is no doubt that the current momentum is due to the attention that the cleanup of Boston Harbor has received, from the citizens of the Metropolitan area to such prestigious organizations as the Office of Management and Budget, the Council on Environmental Quality, and the National Science Foundation. EPA's Region I recognizes the importance of the case studies prepared under the auspices of these latter three organizations. It is the agency's intention to continue the current momentum so that, at long last, there will be effective wastewater treatment for the metropolitan area and Boston Harbor will be clean.

RESPONSES TO COMMENTS BY
REBECCA HANMER

1. As mentioned above, we did not claim that the EIS was begun too early, but that it was begun in advance of step 1 planning, rather than along with it.

2. The comment claims that "the section 208 effort should not attempt to redo effective earlier planning work..." but also that "planning...must be a continuing process which provides for periodic reexaminations...in the light of new information." We agree with both comments, and recognize the necessary tradeoffs between them. We found, in general, that EMMA was not "effective" in relation to the goals of the 208 effort, and that there was significant "new information". We believe that EPA made the same finding, in the EIS effort.

3. The comment is correct on the legislative history of the Act, as a one-time effort, and we do not necessarily support O&M funding as a grant program. We do support an increased effort to make the costs known to the communities, to involve them in the search for acceptable designs (and in quality control), and to ensure that plants are operated correctly. For example, one of our recommendations was for increased enforcement of permits for existing plants.

O&M funding should only be considered as part of an effort to eliminate the planning bias towards high-capital facilties. O&M support, on the other hand, is a reasonable part of the NPDES program, and should be expanded through increased T/A, training, and other methods.

4. In fact, inflation in O&M costs should act to decrease the discount rate. However, it is important that EPA is at least considering the topic.

MARTIN WEISS
METROPOLITAN DISTRICT COMMISSION

WE THANK YOU FOR THE OPPORTUNITY TO COMMENT ON THE DRAFT REPORTS COLLECTIVELY TITLED "SCIENTIFIC AND TECHNICAL EVALUATION OF THE EPA'S WASTEWATER TREATMENT FACILITIES PLANNING PROCESS," POPULARLY CALLED THE BOSTON CASE STUDY OR THE OMB STUDY.

WE FIND INNUMERABLE PROBLEMS WITH THE OMB STUDY. ITS PURPOSE, PRESENTATION AND CONCLUSIONS ARE NEITHER CLEAR OR CONSTRUCTIVE. ITS RAMIFICATIONS ARE CLEAR; IT ADDS TO THE CONFUSION OF AN ALREADY DIFFICULT AND COMPLICATED PROCESS. THE GENERAL PUBLIC CAN'T HELP BUT BE BAFFLED BY YET ANOTHER STUDY RATHER THAN A PLAN OF ACTION. THE GOVERNMENTAL MANAGER AT ALL LEVELS IS LEFT WITH A SENSE OF FRUSTRATION, IF NOT PARALYSIS, BY THE ABSENCE OF MEANINGFUL GUIDANCE IN IMPLEMENTING THE CLEAN WATER PROGRAM.

WHEN THE STUDY BEGAN MDC WAS TOLD THAT ITS PURPOSE WAS TO IMPROVE THE ADMINISTRATION OF THE FEDERAL WATER POLLUTION CONTROL ACT USING METROPOLITAN BOSTON AS A CASE STUDY. THIS SUGGESTS THAT A COMPREHENSIVE EVALUATION OF FEDERAL LEGISLATION, REGULATION, POLICIES AND PROGRAMS WAS TO BE UNDERTAKEN. ① WE EXPECTED THE STUDY TO PRODUCE A SET OF PROPOSALS FOR IMPROVING FEDERAL LEGISLATION AND ADMINSITRATION THAT WOULD BENEFIT THE IMPLEMENTATION OF POLLUTION CONTROL PROJECTS IN METROPOLITAN AREAS SUCH AS OURS. INSTEAD THE OMB STUDY HAS RESULTED IN FOUR UNCORDINATED, UNSUCCESSFUL, INCOMPREHENSIBLE REPORTS HIGHLY CRITICAL OF ALL LOCAL EFFORTS BY FEDERAL, STATE AND METROPOLITAN AGENCIES.

THE PURPOSE OF THE STUDY AS FURTHER EXPLAINED IN THE ENGINEERING REPORT, "IS TO DOCUMENT AND EVALUATE THE DECISION-MAKING PROCESS IN THE ADMINISTRATION OF THE CLEAN WATER GRANT PROGRAM IN THE BOSTON METROPOLITAN AREA. THE EVALUATION BY THE FEDERAL INTERAGENCY STUDY TEAM AND THEIR CONSULTANTS, IN

PERFORMING THE CASE STUDY, IS INTENDED TO OBSERVE THE ACTIONS INVOLVED IN REACHING DECISIONS AND NOT TO INFLUENCE THOSE DECISIONS. THE TEAM IS INTERESTED MORE IN HOW A DECISION IS REACHED THAN WHAT THE FINAL DECISION IS..." THE OMB STUDY MADE NO ATTEMPT TO PRESENT THE RANGE OF THINKING AND ALTERNATIVES UNDER CONSIDERATION SINCE THE CONCLUSION OF THE EMMA STUDY. FURTHER, IT SEEMS NAIVE AT BEST TO SUGGEST THAT SUCH HIGHLY DESTRUCTIVE REPORTS WERE MERELY INTENDED AS OBSERVATIONS RATHER THAN TO INFLUENCE THE PROCESS.

IN THE ENGINEERING REPORT THE READER COULD EXPECT SPECIFIC CONCLUSIONS AND RECOMMENDATION, BUT NONE ARE DISCERNIBLE. THE REPORT PRESENTS A CONFUSING ARRAY OF CATEGORIES, ALTERNATIVES AND CONSTRAINTS WITH A SUGGESTION THAT MDC'S ELIGIBILITY FOR FEDERAL GRANTS SHOULD BE DRASTICALLY CURTAILED. IT HINTS AT A SERIES OF PROGRAMS AND A SEQUENCING OF PROJECTS TO REDUCE WASTEWATER FLOWS REQUIRING TREATMENT, WHICH ARE BEYOND MDC'S JURISDICTION AND CONTRARY TO FEDERAL LAW. THESE PROGRAMS INCLUDE LIMITING GROWTH WITHIN THE MDC'S SEWER SERVICE AREA, SEPARATION OF SANITARY AND STORM SEWERS, WATER CONSERVATION, REDUCTION OF DOMESTIC WASTEWATER CONTRIBUTIONS, INFILTRATION/INFLOW REDUCTION, CONSTRUCTION OF PRIMARY TREATMENT FACILITIES AND ELIMINATION OF SECONDARY TREATMENT. THERE IS NO UNDERSTANDING THAT MDC PERFORMS THE FUNCTION OF WHOLESALER IN THE PROVISION OF WASTEWATER COLLECTION, TREATMENT AND DISPOSAL SERVICES. THERE IS NO MENTION THAT RESPONSIBILITY FOR MANY OF THESE PROGRAMS, IE. LIMITING GROWTH, SEWER SEPARATION, I/I REDUCTION WOULD FALL TO MDC's MEMBER COMMUNITIES. ② NOR ARE THE COSTS TO THE MEMBERS ESTIMATED OR THE INSTITUTIONAL CHANGES OR THE THE PERSONNEL REQUIREMENTS ASSESSED. WHILE SUCH A PROGRAM MAY BE COST-EFFECTIVE FOR THE MDC BY REDUCING WASTEWATER TREATMENT FACILITIES, IT IS NOT DEMONSTRATED THAT SUCH PROGRAMS WOULD BE COST-EFFECTIVE FOR THE MEMBER COMMUNITIES TO IMPLEMENT.

THIS REPORT PURPORTS TO DISCUSS FACILITIES PLANNING BY THE MDC, BUT FACILITIES PLANNING FOR MAJOR MDC PROJECTS WAS NOT UNDERWAY DURING THE OMB STUDY.

THE EMMA STUDY, FUNDED BY THE MDC AND THE U.S.CORPS OF ENGINEERS AND COMPLETE IN 1976, WAS NOT INTENDED TO BE A FACILITIES PLAN. IT WAS A COMPREHENSIVE PROGRAM FOR UPGRADING AND IMPROVING THE METROPOLITAN SEWERAGE SYSTEM. AS SUCH IT IDENTIFIED SPECIFIC PROJECTS, TREATMENT PLANTS, COMBINED SEWER OVERFLOW CONTROL FACILITIES, INTERCEPTORS AND PUMPING STATIONS, FOR FACILITIES PLANNING.

THE OMB STUDY CRITICIZES EPA'S EIS BECAUSE IT WAS INITIATED PRIOR TO FACILITIES PLANNING AND BECAUSE IT IN FACT TRIED TO PRODUCE A FACILITIES PLAN. LIKEWISE THE OMB STUDY TREATS THE EMMA STUDY AS A FACILITIES PLAN AND IN EFFECT ATTEMPTS TO SUGGEST ANOTHER FACILITIES PLAN. IT WOULD BE WELL IF ALL INTERESTED PARTIES ALLOWED MDC TO DEVELOP BONA FIDE FACILITIES PLANS, WHICH WILL INCLUDE PRELIMINARY ENGINEERING, ENVIRONMENTAL ASSESSMENTS AND PUBLIC PARTICIPATION AS REQUIRED BY EPA, BEFORE BLASTING NON EXISTING FACILITIES PLANS.

AS FOR THE REPORT ON WATER QUALITY OBJECTIVES IT CONTAINS A SPECIFIC RECOMMENDATION. IT ADVOCATES THAT STREET CLEANING AND THE FLUSHING OF LOCAL SEWERAGE SYSTEMS IS THE ANSWER TO THE PROBLEM OF COMBINED SEWER OVERFLOWS. IT CONTENDS THAT FLUSHING DEVICES CAN BE INSTALLED AND OPERATED AT A FRACTION OF THE COST OF STRUCTURAL IMPROVEMENTS. THE WATER QUALITY REPORT PRESENTS INACCURATE, FRIGHTENING AND UNSUBSTANTIATED CHANGES. IT CRITICIZES THE STATE'S WATER QUALITY STANDARDS BUT FAILS TO ACKNOWLEDGE THAT THEY WERE IN PROCESS OF REVISION WHEN THEIR REPORT WAS BEING DRAFTED. IN FACT, THE NEW STATE WATER QUALITY STANDARDS SIGNIFICANTLY INCREASES THE DISSOLVED OXYGEN PARAMETER

FOR BOSTON HARBOR. IT ASSUMES THAT DISINFECTION OF COMBINED SEWERS WILL NOT BE NEEDED WITH A FLUSHING PROGRAM, BUT NEGLECTS TO GIVE EVIDENCE THAT THIS WILL BE THE CASE. FURTHER IT AROUSES FEAR OF THE USE OF CHLORINE AS A DISINFECTANT OF WASTEWATER BASED ON LIMITED EXPERIENCE WITH THE DISINFECTION OF HIGHLY TREATED DRINKING WATER. THE CHLORINATION OF WASTEWATER IS ACCEPTED PRACTISE THROUGHOUT THE NATION. WHILE THERE IS RESEARCH TAKING PLACE ON THIS SUBJECT, AT THIS TIME THERE IS NO OTHER KNOWN FEASIBLE, COST-EFFECTIVE METHOD OF DISINFECTION. THE REPORT DOES NOT DISCUSS WHETHER FLUSHING AND STREET CLEANING ALONE WILL BE ADEQUATE TO ACHIEVE SOLIDS REMOVALS OR WHETHER ADDITIONAL FACILITIES WILL BE NEEDED, ALTHOUGH THE REPORT INDICATES THAT INTENSIVE STREET CLEANING PROGRAMS IS AN UNTRIED METHOD OF POLLUTION CONTROL. FINALLY, THERE IS NO RECOGNITION OF THE MANAGEMENT ISSUES OR ANY BACKUP FOR THEIR COST ESTIMATES ON IMPLEMENTING A FLUSHING PROGRAM.

THE EMMA STUDY BRIEFLY EXAMINED VARIOUS ALTERNATIVES FOR THE CONTROL OF COMBINED SEWER OVERFLOWS, SUCH AS STORAGE, SEWER SEPARATION AND SOLIDS REMOVAL. COST ESTIMATES WERE PRESENTED ON THE ALTERNATIVES OF HOLDING TANKS WITH DETENTION AND CHLORINATION FACILITIES AND IT RECOMMENDED FURTHER INVESTIGATIONS DURING FACILITIES PLANNING.

THE MDC BEGAN FACILITIES PLANNING FOR CONTROL OF COMBINED SEWER OVERFLOWS THIS SUMMER UNDER FOUR SEPARATE CONSULTANT CONTRACTS - ONE EACH FOR BOSTON INNER HARBOR, THE CHARLES RIVER BASIN, DORCHESTER BAY AND THE NEPONSET RIVER ESTUARY. UNDER THESE CONTRACTS THE CONSULTANTS WILL BE IDENTIFYING AND EVALUATING A RANGE OF STRUCTURAL AND NON-STRUCTURAL ALTERNATIVES AND THEIR IMPACTS ON WATER QUALITY IN BOSTON HARBOR AND ITS TRIBUTARY RIVERS. THE ALTERNATIVES WILL BE FORMULATED AFTER A THOROUGH EXAMINATION OF THE EXISTING

COMBINED SEWERAGE SYSTEM, ITS FLOWS AND CHARACTERISTICS AS WELL AS FURTHER ANALYSIS OF BOSTON HARBOR WATER QUALITY AND ITS EXISTING AND POTENTIAL USES.

THE MDC AS WELL AS OTHER AGENCIES LONG AGO RECOGNIZED COMBINED SEWERS AS THE SINGLE GREATEST SOURCE OF POLLUTION IN BOSTON HARBOR. TO SUGGEST FOR A MOMENT, AS THE WATER QUALITY REPORT DOES, THAT MDC IS UNCONCERNED ABOUT WATER QUALITY IS IRRESPONSIBLE AS WELL AS ERRONEOUS. WE NEED ONLY POINT OUT THAT THE BATHING BEACHES OF BOSTON HARBOR, BOATING AND SAILING ON THE CHARLES RIVER AND SPORTS FISHING THROUGHOUT ARE MAJOR RECREATIONAL RESOURCES OF THE METROPOLITAN BOSTON UNDER THE JURISDICTION OF THE MDC. WE ARE CONFIDENT THAT THE FACILITIES PLANNING PROCESS NOW UNDERWAY WILL RESULT IN A COST-EFFECTIVE SOLUTION FOR CORRECTING THE WATER QUALITY PROBLEMS ASSOCIATED WITH COMBINED SEWER OVERFLOWS.

CONCLUSION- THE OMB STUDY HAS CONTRIBUTED LITTLE, IF ANYTHING, TOWARD IMPROVING THE PROCESS, PLANNING AND DECISION-MAKING WHICH WILL BRING ABOUT CLEANER WATERS IN BOSTON HARBOR AND ITS TRIBUTARIES. THE STUDY TEAM SPENT A GREAT DEAL OF TAXPAYERS' MONEY, ABOUT $500,000, WHICH COULD HAVE BEEN PUT TO BETTER USE ON EFFORTS TO GET THE JOB DONE. THEY CRITICIZED ALL PAST AND PRESENT TECHNICAL EFFORTS MADE TO SOLVE THE PROBLEM, TOTALLY IGNORED THEIR ASSIGNED OBJECTIVE TO EVALUATE THE ADMINISTRATIVE PROCESSES, AND THEN PROPOSED THEIR SOLUTIONS BECAUSE "THEY KNOW HOW TO DO IT BETTER." IN MY OPINION THIS PROJECT ACCOMPLISHED THE EXACT OPPOSITE OF ITS STATED PURPOSE.

RESPONSE TO COMMENTS BY
MR. WEISS

1. No response necessary.

2. We believe that such an understanding is shown in the report, particularly in sections 3.2, 6.1, 6.2, 7.2, and 7.3.

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

EVELYN F. MURPHY
SECRETARY

Statement to Federal Interagency Study Team Regarding Case Study of Sludge Management Planning in the Boston Metropolitan Area, September 27, 1978.

Presented by Fifi Nessen, Massachusetts Executive Office of Environmental Affairs.

The EOEA has found the Boston Case Study reports to be very useful. They have provided all of us, government agencies and citizens alike, with a perspective on the wastewater construction grants program underway for Boston Harbor and have served to re-emphasize the need to keep water quality objectives as a prime goal of the program.

I am limiting my comments to the sludge management report since my responsibility to the Secretary of Environmental Affairs lies in sludge management. This study, as you know, focuses on the primary sludge management issue for Boston Harbor. One of its findings is that the technical uncertainties and risks associated with projected incinerator performance, pyrolysis, and land application, warrant delay of a commitment to a large capital solution. The report also points out that the sludge management program has been underway for seven years and is not yet finalized. During this time and several years to come, sludge continues to be discharged into Boston Harbor, contributing to its pollution. In retrospect, we can see that the rapidly changing technology, economy and energy situation have mitigated against a simple, easily implemented solution. There is a lesson to be learned from our experience: a more comprehensive planning approach, including thorough evaluation of alternative and innovative technologies earlier in the construction grants process might have avoided some of the delays incurred in this project. More importantly, ① there is a point at which interim remedies, like composting, which are not as costly as a large capital investment are needed to alleviate pollution and to provide meaningful information which would help evaluate alternatives in a period of rapidly developing technology. Although we would not view ocean disposal as a viable alternative, even on an interim basis, we do believe that after seven years, some action must be initiated to diminish or eliminate sludge discharge into the harbor, while analysis continues in an effort to find a long term solution which is environmentally safe and cost effective. This analysis process would be facilitated by the availability of data on the performance of existing sludge incinerators and to this end we support the report's recommendation that EPA provide such a clearinghouse service.

Another lesson to be learned from the Boston case study, which was also pointed out in the case study report, is that the federal grant structure works against co-incineration alternatives. Though co-disposal is technically feasible and economically and environmentally comparable to mono-incineration in Boston, it was rejected primarily for the two following reasons: (1) the institutional situation complicated implementation and (2) the grant structure made co-incineration more costly for the MDC because grants would be funded only on a pro-rated basis for costs associated with wastewater treatment. The sludge management report recommends that construction grants programs allow a municipality to contribute capital for a portion of a private facility in return for partial ownership. We would also recommend that the grants structure be changed to permit federal funding of co-disposal in dollars equivalent to the cost of a sludge incinerator rather than on a pro-rated basis.

At this point, the primary sludge problems in Boston remain unresolved. The case study makes some valid criticism and some good recommendations. It too, picks up the thread running through the other case study reports: the construction grants program, though well intentioned, has tended to loose sight of its water quality objectives through its focus on treatment facilities. We would hope that the perspective provided by the sludge management report will result in a revised strategy which will allow interim remedial measures to alleviate sludge pollution in instances such as Boston Harbor, where finalization of a recommended long term solution takes more than five years.

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RESPONSES TO COMMENTS BY
FIFI NESSEN

1. We concur.

2. We concur.

The Commonwealth of Massachusetts
Water Resources Commission
Division of Water Pollution Control
110 Tremont Street, Boston 02108

OFFICE OF THE DIRECTOR

October 12, 1978

Council on Environmental Quality
Office of Public Affairs
722 Jackson Place, N.W.
Washington, D.C. 20006

Re: The Boston Case Study

Gentlemen:

The Division of Water Pollution Control welcomes the opportunity to comment on the four reports which comprise the Boston Case Study. We wish to point out that we are seriously concerned that these reports do not contain the latest information and therefore do not properly reflect the current situation. We were also advised that for all intents and purposes updated information will not be incorporated in the reports. Therefore we request that our comments be made part of the official record and be attached as appendixes to all reports distributed or to be distributed. Please inform us of your intentions in this regard.

We have separated our comments into two groups. The first group of comments is based upon information that was available during the study period while the second group reflects comments based on subsequent occurences.

COMMENTS - BASED UPON INFORMATION THAT WAS AVAILABLE DURING THE STUDY PERIOD:

INSTITUTIONAL REPORT

It is unclear what the study time frame is for this report. They have inincluded recent information (PRM's, PL 95-217) to support their case but have ignored other current information which does not support their case. ①

Several comments were made to the effect that construction grants operated independently of water quality goals or the Basin Plans. Grants personnel continually refer to completed Phase I Basin Plans when reviewing plans of study and facilities plans and are in contact with our Westborough Water Quality Office to obtain the latest information and updated load allocations. ②

All completed facilities plans are sent to Westborough and the Regional Offices for comment prior to any approval. The Basin Plans as well as the NPDES permits are significant inputs to the priority list. Ninety percent of the FY 79 projects are enforceable under the Clean Waters Act. ② Additionally, the Division's priority list criteria contain bonus points for effects on uses. Under this system Lynn received the highest priority on the FY 79 list. It is testimony to the effectiveness of the criteria and not concidence that Lynn is the last major raw sewage dishcarger in Massachusetts.

Your report also concludes that the Division does not perform a detailed review of the plans and specifications. In fact only the Division does do detailed review and EPA accepts our technical expertise. ③ While the Division may have lacked sufficient manpower it has never placed quantity before quality. An in depth study of the "design errors" referred to will show that the majority are due changes in the loads received by the plant that could not have been anticipated.

Finally the Division should not assist the communities in their selection of consultants. This is an unwarranted intrusion in local affairs and a violation ④ of law under the States conflict of interest statutes, not to mention an inhibition of free enterprise.

WATER QUALITY REPORT

Our major criticism of this report is its total dependence on the EMMA report as a cast-in-stone solution rather than as a feasibility study. The report criticizes secondary treatment at the Deer and Nut Islands treatment facilities. ⑤ A research study and modeling effort of Boston Harbor sponsored by this Division in 1974 showed that the primary treatment facilities did not have an adverse impact on the Harbor water quality. The Division has long been publicly against secondary treatment at these plants. The report fails to mention either of these facts. The report also fails to mention that the Division and EPA were required by law to include secondary treatment as a minimum in all municipal NPDES permits.

The report criticizes the chlorination detention facilities and recommends instead, flushing up to 3 times a day along with street vaccuming. The flushing will require substantial amounts of water and capital investment. The Corps of Engineers Northeast Water Supply Study stated that the metropolitan area water supply resources were inadequate. The report does not address this. The facilities planning report by Kennedy Engineers recommends decreasing water use. This is in direct conflict with the Water Quality Report recommendations. The water quality report also found that separated storm water discharges have a significant impact on water quality. The Kennedy Engineers report recommends separation however the report did not include any storm water treatment costs. Here again the reports contain conflicting recommendations.

The report states that the satellite plants will not improve the water quality in the Charles and Neponset Rivers. The Division's own analyses showed this to be true however, this was not mentioned in the report.

The Division is in agreement with the reports recommendation that the EPA institute Operation and Maintenance grants. We feel that communities need funancial assistance to help pay for the high operational maintenance costs and also this would help assure proper operation for the plants. ⑥

FACILITIES PLANNING REPORT

This report also assumes that the EMMA study is cast-in-stone and fails to recognize the report as the feasibility study it is. The report is critical of the fact that the EMMA study assumed I/I rates rather than perform an I/I analysis. Kennedy Engineers then assume an I/I rate without doing any analysis, the very thing they are critizing. Furthermore, the costs used for rehabilitating the system were unreasonable even in 1976 dollar terms. The more appropriate replacement costs for the communities is $25 to $65 per lineal foot and for MDC sewers $65 to $450 per lineal foot. These costs are 2 to 6 times greater than those presented in the report. These costs should be reflected in the cost effective analysis. Furthermore, Kennedy Engineers should state that they have no information to document their I/I assumptions nor do they have any information to doubt the numbers used in EMMA.

The report recommends separation of combined sewers despite the fact that previous reports have shown it not to be cost effective. The report ignores this and the fact that most of the older buildings have combined internal plumbing. Furthermore, the replacement costs assumed are not representative. The cost effective analysis does not take into account storm water treatment, an apparent need according to the Water Quality Report.

The report also assumes an artificial gallon per capita wastewater flow rate. This rate is supposedly based on water conservation. While the consultants have information regarding water comsumption they did not determine the actual wastewater production rates. Therefore, the nature and degree of water conservation programs is unknown. This may be why the consultants neglected to include any costs associated with water conservation. Furthermore, their flow projections did not include flows generated by sewer flushing as recommended in the Water Quality report.

The report is critical of the Division of Water Pollution Control for not including MDC projects on the priority list to correct combined sewers in Norwood, Revere, Stoneham, Waltham, and Milford. This criticism is ill-founded since these communities do not have combined sewers and furthermore the MDC is not responsible for community sewerage systems. The report also fails to mention that the Town of Ipswich was nearing completion of construction of a secondary treatment plant. This type of information was given for other communities.

The report also recommends that additional pumping be provided at Deer Island. We agree with this and will seek to ensure that this is studied under the current CSO facility planning being done by the MDC.

Based on the above we recommend that the sewer replacement costs be revised, that the report recommendations be coordinated with the water quality report and revised accordingly, and that the criticism of EMMA handling of I/I and wastewater generation rates be deleted and that the report be restricted from making unfounded assumptions regarding I/I and wastewater generation rates.

SLUDGE MANAGEMENT STUDY

Refer to our comments relative to latest information below.

COMMENTS - BASED UPON INFORMATION SUBMITTED AFTER THE STUDY PERIOD:

INSTITUTIONAL REPORT

The report states that the Division discourages alternative or innovative processes and imposes additional requirements because of a lack of technical expertise. First the Division does not discourage alternative and innovative processes and in fact under the Division's priority list criteria they receive as many points as conventional solutions. You will find several alternative solutions identified for funding on the FY 79 priority list. Secondly, while it is true that some additional information may be required on alternative and ⑦ innovative processes, lack of expertise is not the reason. Most of these processes were developed and tested in other parts of the country. New England has its own special climatological and geological conditions which are unique and often require special consideration. Since most communities lack expertise the Division must assist them in the review of these processes. This must be and is done at the facilities planning level.

The report also criticizes the Division's ability to review final plans. ⑧ The Division's construction grants staff has been increased from 4 to 24 people. While most of our review time is spent reviewing the guts of a treatment plant it should be pointed out that no state or the EPA does a complete review.

WATER QUALITY REPORT

The report is critical of the Division's Water Quality Standards, however, new standards, which incorporate many of the revisions suggested by the report, were adopted during the summer of 1978. The report also states that the satellite plants will not improve water quality in the Charles and Neponset Rivers. The recently published EIS on the EMMA study also recommends not building the plants, and additional studies performed by this Division also support this conclusion.

It is important to note that the Division has always questioned the need for secondary treatment at Deer Island. In 1974 the Division funded a research project to model Boston Harbor. This model verified that primary treatment was adequate to meet the water quality standards for Boston Harbor. Furthermore, the MDC has filed a Notice of Intent to file for a secondary waiver under section 301 (h) of PL-95-217. The Division is confident that the data presently being collected by the MDC for inclusion in the waiver application will support the adequacy of primary treatment.

The report recommends non-structural solutions such as sewer flushing and street sweeping for correction of combined sewer overflows. Recent research of sewer flushing has shown that it does not reduce the need for off line storage. This will add costs which will probable make sewer flushing economically undesirable. However, flushing will be one of many alternatives addressed in the facilities plan studies of combined sewer overflows recently initiated by the MDC.

FACILITIES PLANNING REPORT

The Facilities Planning Report critized the EMMA study for not recommending I/I reductions, and claimed the I/I estimates were to liberal. The analyses for the North and South systems have now been completed. The I/I estimates contained in EMMA were very close to those rates found in the North system and were substantially lower than those found in the South system. Neither system had any significant amounts of I/I that were cost effective to remove. This information essentially renders the Kennedy Report's cost effective analysis meaningless.

SLUDGE MANAGEMENT REPORT

This report is critical of the choice of incineration for sludge treatment rather than a less technologically intensive alternative such as composting, landfilling and ocean discharge. In light of the current Federal laws there is no need to discuss why ocean discharge of sludge was not considered. However, the recently completed EIS contains recommendations which do impact on this report. The EIS recommends that the new Nut Island and Deer Island facilities both be constructed on Deer Island. The recommended sludge management plant calls for incineration of primary sludge and Deer Island secondary sludge, composting a portion of Nut Island secondary sludge on Squantum Point and landfilling the remaining secondary sludge at an unspecified 84 acre site. The ERT sludge report prefers composting over incineration but found it to be cost effective only if the composting occurs at Deer Island. Since the facilities are recommended to be combined at Deer Island there will not be sufficient land available to compost. Given the recommendations of the EIS it appears appropriate to continue with plans for primary sludge incineration.

We have included a copy of the Division's FY 79 Priority List and latest Water Quality Standards for your information. If you or your contractors have any questions regarding our comments or how best they can be incorporated into their reports, please contact this office.

Very truly yours,

Thomas C. McMahon

Thomas C. McMahon
Director

enclosures: (2)

cc: E.O.E.A., 100 Cambridge Street, Boston, Ma. Attn: Madelyn Kolb
Commissioner David Standley, 100 Cambridge Street, Boston, Ma.
Metropolitan District Commission, 20 Somerset Street, Boston, Ma.
Attn: Martin Weiss

TCM/GSH/dlo

RESPONSES TO COMMENTS BY
THOMAS C. MCMAHON

1. The time frame was stated to be current through January 31, 1978.

2. (Second and third paragraphs): The statements made in the comment show that the Basin plans enter the priority list through "bonus points" and do not directly prioritize projects. See Figure 402 for the temporal relationships of 303 (e) plans to other planning efforts.

3. The review by the division is generally limited to sizing of facilities, elevation and the like, which is not what we mean by "detailed review", and is not sufficient to ensure that the plants built to those plans will work. If the loads change in unanticipated ways in a large number of cases, this suggests that the problem is not an act of God, but rather that we do not know how to build plants to meet real conditions.

4. Your points may be true; however, we were simply concerned with whether it would be likely to result in improved facilities.

5. We have referenced your comments in the text.

6. We did not recommend operations and maintenance grants, but only stated that O&M funding was one potential approach to a growing problem. We do not believe that it is the best one, or should be implemented alone, but feel that improved designs, consideration of O&M costs to a greater degree in design, and increased technical assistance and O&M contracting, all should be part of the complete package.

7. As was stated, we believe that the Division is moving in the right direction in consideration of alternative or innovative processes. However, we also believe that innovative processes should be supported by putting them on equal footing with conventional approaches, in terms of the requirements on the potential grantee. This places an extra burden on the division for such projects, since it (not the committee) would have to invest in the necessary expertise.

8. The increase in staff has helped, but we agree that no state does a complete review. We also note that in no state are the plants in compliance, based on a recent report for EPA.

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering
110 Cambridge Street, Boston 02202

DAVID STANDLEY
COMMISSIONER

October 12, 1978

Council on Environmental Quality
Office of Public Affairs
722 Jackson Place
Washington N.W., D.C. 20006

Dear Sirs:

The following are comments on the document entitled "Institutional Aspects of Wastewater Management - The Boston Case Study" which I hope will be of assistance to you.

First, in general, the following should be noted:

1) The report fails to note (even in some sort of introductory paragraph) that significant changes have been brought about by the passage of PL 95-217. ①

2) The report makes statements and judgements on the Section 208 planning process at a time when that process was only partially completed. It is unusual that a case study would be performed at such a juncture rather than when the exercise was completed. ②

3) The report cites examples of certain types of problems for situations and leaves the impression that these are unique to the Boston area when in fact they were actually prevalent nation wide.

4) There are a number of instances of incorrect or mis-interpreted data in the report.

Specific comments are as follows:

1) Page 7 - first paragraph The 208 studies were instructed by EPA (Washington) to use existing data and "existing" 201 plans ③

2) Page 7 second conclusion This is not a true statement ④

3). Page 7 Recommendation Initial 208 plans were allowed to and did address growth management and water supply at least indirectly (which was the only way allowable given that these were "wastewater" management plans. EPA is supporting town initiatives for non-structural solutions (see PL 95-217). ⑤

4). Page 7 last paragraph The problems associated with incomplete basin plans and inconsistencies between programs is largely one of non-synchronization of programs. This should be worked out upon completion and certification of the 208 plans. ⑥

Page 9 first paragraph No longer true (see PL 95-217) ⑦

Page 9 "Since DWPC is not equipped etc." What is the basis for making this statement? ⑧

Page 11 Recommendation Who should determine what the "full range of alternatives" is? ⑨

Page 14 Expanded Public Participation See new EPA regulations on this subject. ⑩

Page 17 Local Government There are some Massachusetts counties that are involved in the Section 208 program. ⑪

Page 41 A.95 procedure The A-95 monitor is circulated to a large number of groups. Anyone can ask to review any project. OSP does not have control over reviewers. ⑫

Page 47 2nd paragraph Basin plans will incorporate 208 plans to the extent that they are certified. The November 1, 1978 is no longer accurate. ⑬

Page 47 3rd paragraph The statement that "they are to evaluate—— Act". and "These funds are to be used ——— alternatives" are incorrec ⑭

Page 55 re: reaction of communities This section contains inaccurate and misleading statements which lead the reader to conclusions that are grossly in error. ⑮

Page 57 3rd paragraph "As a result ——— EMMA recommendations ", I disagree with this statement. ⑯

Page 57 6th paragraph How was the conclusion reached that sampling data was not integrated into control strategies? ⑰

Page 71 first 3 paragraphs I completely disagree with the assessment portrayed here. ⑱

19. Page 74 conclusions Again this section includes a number of statements some of which are not now true (due to PL 95-217) and others which have never been true. ⑲

20. Page 75 "however the Basin Plan ----- wholesale" This will not happen as all that will be incorporated are certified elements. ⑳

In conclusion, I hope that a concerted effort will be made to update and correct the contents of this report prior to further use for the purpose of policy or program change since in my opinion, failure to do so will cause the potentially beneficial aspects of the report to be overlooked while concentrating on the obvious shortcomings.

Sincerely,

Daniel P. McGillicuddy
Chief Planner

DPMcG/ls

CC: Bill Butler, EPA
Paul Taurasi, DWPC

RESPONSES TO COMMENTS BY
DAN McGILLICUDDY

1. Revisions to this effect have been made in the Executive Summary.

2. This report was not intended to be a case study of the 208 planning effort. Rather, it was intended to analyze the interrelationships between planning efforts at all levels mandated by the Clean Water Act in 1972. As such, the role played by the 208 program and the rest of the state's continuing planning process in providing and implementing water quality management strategies is of major importance in assessing the need for changes in Federal policies and programs.

3. The text has been revised to clarify the source of the guidance to incorporate existing data and 201 plans.

4. The 208 project's focus on nonstructural controls came late in the process, and at the urging of citizen groups. We understand that, while the 208 did refocus its efforts in this direction for the suburban and rural areas in the study, a blanket package of controls was recommended for most MSD communities. We understand that the 208 agency tacitly used the Memorandum of Agreement between MAPC and the MDC as a limit to the bounds of the study: those parts of the study area covered by the structural measures proposed in EMMA had lower priority than areas outside the MSD. As time was limited and the number of communities that had to be studied was quite large, the nonpoint problems and nonstructural solutions in the MSD area received scant attention.

5. We still believe that these issues have not been addressed on an areawide basis in enough detail to allow for informed decision-making. While we realize that the directives on these issues came from EPA, and that the choice was not that of the state or the individual RPA's, we feel that the 208 process would have been a good place to start some type of coordination effort. As always, our concern is for the Federal program, and how it can be improved.

6. To the extent that the water quality modelling effort conducted in conjunction with the Upgrading EIS will be incorporated into the Phase II Basin Plan for the urbanized portions of the Charles River (south of the Watertown Dam) and Boston Harbor, this problem will be at least somewhat solved. However, we still believe that basin and 208 plans should still be prepared for those areas that appear to have fallen through the cracks and have received little, if any, analysis. At any rate, in the areas for which there are no Phase I basin plans (or where EMMA is the Phase I plan), little guidance on water quality priorities is provided to the construction grants process.

7. The text has been clarified to reflect changes in the law.

RESPONSES TO COMMENTS BY DAN MCGILLICUDDY (Continued)

8. This statement is based on interviews with Division staff and with consulting engineers who have proposed alternative solutions.

9. As noted in the other comment, EPA Region I has also asked this question, and is seeking guidance.

10. A footnote to this effect has been added to the text.

11. This has been clarified. It should be noted that these are the counties that are roughly contiguous with the boundaries of regional planning agencies. Their involvement comes more in terms of input to the RPAs than in terms of traditional county activity.

12. While the A-95 Monitor is circulated to a large number of state agencies, and in theory, anyone in the Commonwealth can ask to review a project, DSP indicates that the same group of agencies usually responds to construction grant applications.

13. Thank you. This has been clarified in the text.

14. The first statement has been clarified in the text to the effect that the emphasis on the use of third year funds for implementation is a regional perspective, while the national EPA is emphasizing planning as a priority for these funds.

15. The text has been clarified to indicate that much feedback from communities was considered and acted upon--after publication of the Preliminary Basin Report. However, within the time frame of this report, this observation was based upon a review of public comments in workshops, meetings and on the preliminary Basin reports. It should be noted that the 208 staff interviewed viewed the reports as preliminary plans, not public participation documents.

16. This section has been revised to indicate that nonstructural controls were proposed for communities in the EMMA study. However, within the time frame of this project, water quality problems in these communites were given lower priorities than those in outlying towns, in anticipation of the publication of the Upgrading EIS and the actual Step 1 work in the MSD.

17. The stormwater sampling program was still on-going at the time that the Basin reports were published. This section has been updated with a footnote.

18. The section on public contacts has been revised. The sewer service area definition methodology was that used in the development of alternatives for the preliminary Basin reports, and was revised on an informal basis at the request of specific towns.

RESPONSES TO COMMENTS BY DAN McGILLICUDDY (Continued)

19. A footnote has been added to indicate the effect of P.L. 95-217.

20. This has been clarified in the text.

Public Meeting on Federal Boston Wastewater Management Study
September 27, 1978
(PLEASE PRINT AND TURN IN AT DOOR)

NAME Shirley M. Brown. REPRESENTING Boston Harbor CAC

ADDRESS Medonko Rd.
Natick, Mass. 01760

PHONE 617-653-7433

(CHECK ONE)
___ I wish to have the floor for 5 minutes to speak
✓ I do not wish to speak

(CHECK ONE)
___ Please have ________ respond to my written question or comment at the meeting
✓ Please have the final contractor report(s) reflect a response to my written question or comment below

MY QUESTION OR COMMENT APPEARS BELOW:

Study observations are accurate as far as they go – Institutional case understated. Proposed recommendations would serve well. Some additional necessary.
* " make additional grants conditional on

specific requirements establishing a mandatory but flexible approach to developing state water resource policies, plans and management programs." * NERBC

Provide incentives for water conservation and reduced flows. Accelerate research to establish minimum stream flow standards and evaluation of ground-water resources; provide incentives for their preservation. ①

Make water conservation mandatory and block expansion of systems.

Increase cost of water - increase water pricing. Charge users for inflow/infiltration.

RESPONSES TO COMMENTS BY
SHIRLEY BROWN

1. The suggested approaches would help coordinate water supply and wastewater planning which we feel is desirable. This was a recommendation which was not included in the 208 effort. One problem, however, is that the relative importance of flow and waste loadings in treatment costs have never been accurately determined, so that it is not clear how much savings would accrue to the MDC under lower per capita flows. This should be evaluated.

19 Oct

NEPONSET CONSERVATION ASSOCIATION
INCORPORATED

October 5, 1978

Lee Daneker
E.P.A., WH-556
401 M. Street, S.W., 20460

Subject: The Public Participation Process

After nearly 10 years involvement in public participation with several Boston area programs - The Boston Transportation Planning Review, the EMMA and the subsequent EIS and #208 wastewater management studies - it is quite clear that citizen involvement in public participation is an important but fragile relationship. Citizen agreement among themselves and motivation for action are far easier to develop in opposition to something than in support of a proposal or program. For a positive relationship some strong but subtle leadership is required to hold a citizen group together and help it focus its attention constructively. Negative factors must be scrupulously avoided.

State agencies do not seem to be naturally effective at stimulating and maintaining citizen interest in a participatory relationship. They are too defensive, they already know the desired outcomes that they feel are in the best interests of the public. For an example the Mass. Dep't of Public Works has a "salt committee" concerned with highway salting practices. There seems to be little liklihood of extending this committee's scope from a review of MDPW practices or staff opinion, essentially a closed issue, to developing a positive program for dealing with general highway pollution or toxic chemical spills in sensitive areas.

Another example of citizen concern not being in line with staff planning has been the insistance of the Citizen Advisory Committee associated with the #208 study in Boston that highway runoff pollution in the groundwater constitutes a serious example of nonpoint source of pollution. This has already seriously degraded a number of local municipal water supplies and the problem is getting steadily worse. Since the wording of P.L. 92-500 specifies "swimming and fishing" there was a strong desire on the part of the staff to avoid dealing with pollution in groundwater, one of the most important pollution problems we must deal with in this particular area.

A fundamental premise for constructive public participation is that it must start at the beginning of the planning process and at the initiation of the grantor. When this is not the case the public finds out late in the process that the program is well advanced, difficult to modify, and is frequently to the disadvantage of some segment of the public. A negative and counterproductive relationship is inevitable. Furthermore the individuals who spearhead or organize the ensuing protest are not necessarily the same as those willing or able to work constructively after the participatory process becomes established.

Lee Daneker, continued.

The objectives of public participation need to be kept clearly in mind:-

- A review of the planning process by a group outside of the agency hierarchy who have a different perspective and collectively may have a broader point of view,
- A two-way communication link between the professionals developing a plan and the public for whom the plan is intended. The normal planning-hearing process is often a one-way communication process only; either the minds of the public were made up before they heard a staff discussion making their comments of little value or negative in character, or the staff presentation given before the public comments is sufficiently complex to preclude much meaningful response at the moment,
- A citizen participatory committee may provide a forum in which individuals from different state or municipal agencies can cross-communicate with each other in an informal or unofficial way.

The enabling legislation or funding agency regulations need to make provision for:

- Direct staff support for the mechanics of the participatory process: a committee meeting place, the means for taking and distributing meeting minutes and notices, background technical information, some specialist consultation, and free access to staff operations,
- Funding allowance for an educational process for public participants,
- Some small degree of reimbursement for direct out-of-pocket expenses for "continuing" participants for whom this is necessary. Without some such provision the involvement of citizens tends to be limited largely to the retired, the wealthy and the unemployed, or to the paid staff of environmental or civic organizations,
- A somewhat greater degree of cost sharing with appropriate organizations so that they can afford to work actively with the education of the general public and with sampling the general public concerns and response. This can be done by local organization meetings open to the public and to news reporters, by special public meetings, and by their local bulletins.

It takes time and patience on the part of all concerned to educate the participants concerning the complexities of any significant program. The essential motivation for the participants can only be the satisfaction of accomplishment and contribution to an important cause. Considerable continuing effort is required by all concerned before the staff and the citizens can develop the mutual confidence required for an effective and constructive relationship. This association must start during the planning stage or the relationship will tend to be a negative one.

Very truly yours,

Waldo H. Holcombe

Waldo H. Holcombe
180 Canton Avenue
Milton, Mass., 02187

RESPONSE TO COMMENTS BY WALDO H. HOLCOMBE

1. We agree with your comments.

Mystic River Watershed Association, Inc.

Dear Ms. Carolyn Isber:

At Waldo Holcombe's suggestion we are enclosing copy of our comment to EPA's Participation Concept Papers.

Sincerely

Herbert T Meyer

Dr. Herbert M. Meyer
275 Massachusetts Ave
Arlington, MA. 02174
October 3, 1973

Mystic River Watershed Association, Inc.

Mr. Lee Daneker
Environmental Protection Agency
WH-556
401 M Street, S.W.
Washington, D. C. 20460

Dear Mr. Daneker:

We are submitting our comments on the memorandum of Mr. Thomas C. Jorling of August 2, 1973, concerning Public Participation in Programs under the Resource and Recovery Act, the Safe Drinking Water Act, and the Clean Water Act.

We appreciate the opportunity to comment on the proposed regulations. They deserve attention by citizens and governments alike because citizen participation is a tool to more efficient working of our democratic principles in government. We have had experience in citizen participation for over ten years, first in the field of the planning of transit and transportation facilities and more recently with EPA projects.

We were under contract with the Metropolitan Area Planning Council during two years of Sec. 208 planning for metropolitan Boston and our comments on the details of Mr. Jorling's memorandum are incorporated in the comments which you are receiving from the MAPC-208 Citizen Advisory Committee. Our comments attached below address general reflections on the trend of effort to " provide for, encourage, and assist public participation."

In our opinion it is necessary to restore the balance which has been loaded in favor of those "approximately 7000 interested parties" who were privileged to comment on your Concept Papers before the present proposal was drafted. Those commentators were largely from state/substate governments and consultants at the exclusion of experienced citizen participants. We hope that your Working Group in OWPM is open minded and has sufficient time to communicate with the present commentators before any finalization occurs.

Sincerely,

H Meyer

Herbert M. Meyer, V.-P., MRWA

Comments of the Mystic River Watershed Association on the draft proposed Regulations for Citizen Participation by T. C. Jorling of August 2, 1978/

I Some History of Participation

The Department of Transportation preceded EPA in the introduction of participation. The DOT had learned the hard way that projects which had been planned, designed, and were ready to be implemented were stalled for years and even eliminated by late citizen opposition, court action and political interference. Thus, DOT introduced the "3-C" Process. The 3 C's stand for continuous, comprehensive, and cooperative. The process includes rules for participation. The process is obligatory for those state/substate applications and projects for which federal aid is being sought and granted.

This Watershed Association participated in the Boston Transportation Planning Review of the early seventies which resulted in the substitution of mass transit for a system of interstate highways into metropolitan Boston. That project is described in a book "Citizen Participation in Transportation Planning: The Boston Experience" by Allan K. Sloan, Ballinger Publishing Company, Cambridge, Mass., 1974. That book characterizes our own role in the restudy by stating that "it was in effect the conscience of the restudy, the first to point out when the restudy drifted from its participatory principles and to remind the participants of the restudy's essential mandate." (p. 94)

II Boston Wastewater Management Planning Study

The Urban Systems Research and Engineering, Inc., Cambridge MA, 02138, is one of four consultants for the Council on Environmental Quality. the National Science Foundation, the EPA, and OMB. These four reports collectively constitute a "scientific and technical evaluation of the EPA's wastewater treatment facilities grants planning process" in the Boston area. The USR&E report deals with Institutional Aspects of Wastewater Management. It has this to say about the public participation throughout that process:

> ...Similar intense involvement in the comprehensive issues has been shown in the 208 CAC, the BHCAC, and the EMMA participation efforts. In all these cases, a relatively small group of citizens has participated intensively. In all cases, they have tried to broaden the issues of concern in the particular study, to make the analysis more comprehensive (emphasis added). They have attempted to look at overall cost-benefit (emphasis added) considerations, including water supply, recreation, land use and water quality -- not just at the best programs for individual towns, or the locations of individual plants. Considering the weak implementation of the SENE recommendations, these private citizens appear to have been the real comprehensive planners. (emphasis added)
>
> Most of them have come from environmental organizations. They have had limited resources, and none of the involvement efforts, except SENE, have attempted to educate them about technical issues. In many cases, they have not received answers to the questions they raise, which seem to be "outside the scope" of each individual plan. Their concerns, however, are important ones, and should continue to be raised until satisfactory answers are given: as described above, water quality and other environmental impacts seem to be ignored in the later stages of the process; these members of the public provide the dominant official voice for those issues (emphasis added).....

The Citizen Advisory Committee of the MAPC 208 Wastewater Treatment Study for metropolitan Boston is confronted this very week with the decision whether to advice the MAPC that their Areawide Plan is ready to be certified by the Mass. Department of Environmental Quality Engineering and thus to become state law or not. When EPA contracted with MAPC three years ago, it insisted that the Areawide Plan had to be prepared and be implementable within two years sharp. Consequently MAPC rushed into hiring a numerous staff which had to wait over a year for the point-source inventories to be compiled by consultants. Now money has run out and neither the preliminary basin reports nor the present draft areawide plan can be re-edited with all the approved comments and corrections in place. Instead appendixes have to be added. How can one expect busy and vaguely informed local officials to utilize the Area Plan meaningfully in that shape? Moreover, more recent developments in the various EPA reports and EIS require a certain adjustment of the thrust of the Area Plan.

The involved agencies are not used to correct such situation. The plan as it stand is of limited usefulness. The CAC is the only independent body which can influence the agencies to look for sufficient funds to perform an editing job and produce a satisfactory Areawide Plan. A CAC will not endear itself to them by calling a spade a spade. On the other hand, the very purpose of Sections 201, 208 and others of P. L. 92-500 is at stake. Your proposed regulations for citizen participation will have to provide the procedural support without which the first-generation of citizen participants will become discouraged, will feel its effort and commitment wasted, and will fail to entice a second generation to serve. The EPA is in the early stages of a truly democratic collaboration between decision makers and the people.

III MRWA's Other Forms of Participation

On July 12, 1976 the Department of Transportation and the Environmental Protection Agency signed a Joint Memorandum of Planning and Program Coordination. The MRWA has had the privilege to pursue two participatory efforts of coordinating water related land projects with water clean-up and urban recreation. A brief description will show the reason why we are suggesting that citizen participation could have an important future in the effectiveness of EPA activities.

One of these projects is the Orange Line Relocation Project in Boston's Southwest Corridor, a half-billion-dollar project. The transportation facilities will be put in a trench between the Back Bay and Forest Hills. That trench runs the length of Stony Brook Valley. The brook is in a culvert, is polluted and crosses the future trench repeatedly. We have proposed that the brook could be rehabilitated at the same time as the transportation trench is being constructed. Thus, the Southwest Corridor would have to be dug up only once. Moreover, the cleaned brook could improve the water quality of the Fens and ponds of Jamaica Plain which badly need a better water quality. The transportation people have assembled stretches of open space along their facility. The Land Use Office of the Region I can confirm the facts. ①

The other project is in the wider Alewife Brook Station area of the Red Line Extension in the Northwest Corridor of the Boston region where we have proposed the creation of an open-space park along the Brook, its tributaries, ponds and wetlands to counterbalance the planned suburban development with water clean-up and recreation. The Land Use Office of your Region I can confirm our progress in the Alewife Brook area. The ability of citizen associations to make different agencies coordinate their planning and programs could increase the application of the Joint Memorandum of July 12, 1976 substantially for the benefit of all. We are suggesting that you consider to draft regulations in support of such efforts.

RESPONSE TO COMMENTS BY HERBERT MEYER

1. Thank you for your supportive comments, and the current information.

NORUMBEGA
ASSOCIATION

Att: Joe McGinn

August 29, 1978

U.S. Environmental Protection Agency
Environmental and Economic Impact Office
John F. Kennedy Federal Building - Room 2203
Boston, Massachusetts 02203

Attention: Robert E. Mendoza

Gentlemen:

The following are comments which I plan to offer at the September 26 "208" Public Hearings in regard to the MAPC Areawide Waste Treatment Plan Draft E.I.S.

- - - - - - - - -

I am Arthur Barnes, President of Norumbega Association. I was a member of the C.A.C. of the EMMA study. I have been a long-time small boat recreational fisherman with an awareness and appreciation of the fertility of Boston Harbor as a great flounder resource area as well as a beautiful place to sail.

My testimony is based on an appeal to you to think of sewage as a potential public asset and to think of the unique characteristics of our harbor, the Deer and Nut Islands sewerage systems and the MDC Sewerage District communities which they are designed to serve.

I will suggest that secondary treatment, with the proposed drying and burning of sludge, NOT be pursued. And that instead there be instituted three interrelated projects:

1) upgraded primary treatment procedures for both effluent and sludge.

2) extension of outfall pipes to a point at least 6 miles off Deer Island.

3) reconstitution of a dilute slurry from the separately treated effluent and sludge, so that the resulting single "homogenized" discharge can be pumped and dispersed continuously with minimization of the tendency of sludge to build up on the harbor bottom.

In making these proposals, I assume that there will be continued progress on several related projects:

a) separation of storm and sanitary sewers in the MDC Sewerage District.

Norumbega Association, Inc., 51 Chestnut Street, West Newton, Mass. 02165 Tel. (617) 332-1270

b) interception and treatment of industrial wastes, heavy metals, non-biodegradable organics, etc. at their source.

c) minimization of point sources of pollution that affect the harbor.

d) upgrading of primary treatment to increase control and reliability.

e) upgrading of treatment of sludge to minimize toxic characteristics.

I ask that you join me to get a mind-set that allows us to think of sewage, when properly treated, as a rich resource of organic nutrients and a public asset rather than a nuisance. We have observed many years of successful use of both effluent and sludge as fertilizer and soil conditioners when dispersed on farms, forests, gardens and lawns.

My background includes the childhood observation and appreciation that cow manure in a huge barnyard pile is a public nuisance -- but when it is spread over fields on which hay and corn was subsequently planted it helped produce large increases in crops which in turn increased beef and pork yields for the farmer.

As one of thousands of Boston Harbor recreational fishermen I observe a similar beneficial effect of the dispersal of sewage effluent and sludge - both sources of organic nutrients - in an ocean setting. In Boston Harbor the vegetation and animal life, beginning with the smallest organisms and going up the chain of interdependent plants and animals, has yielded an excellent yearly source of commercial and sports fishing.

So much for background. How can we best manage a public nuisance so that it may yield a public benefit at an optimum cost/benefit ratio? We urge specific consideration of an upgraded primary treatment system in both the Nut and Deer Island plants rather than going to a secondary treatment system. We urge EPA and EOEA to consider the MDC Boston Harbor systems as an experimental case study and to approve such an approach in order to take advantage of the positive nutrient attributes of properly treated effluent AND sludge. These major by-products of treated waste should be handled in a manner that will insure wide dispersal and rapid assimilation to avoid the specter of an accumulation of "tar like" residue which is conjured up by tales about New York harbor.

For many Boston harbor boaters there are uneasy memories of occasions on which the Nut Island facility has evidendently had to resort to a by-pass pipe and pumps to get rid of incompletely treated sewage into the harbor only a mile away and in the midst of a crossroads of recreational boating and fishing. The resulting very visible and unsavory appearance of the harbor has come to the attention of more thousands of Boston residents and visitors as the harbor and its islands gain in popularity as our largest public recreation area. So, we urge high priority be given to the "6 mile pipe" portion of the overall project - with an early target date for its completion.

With reference to the Draft Areawide Waste Treatment Management Plan - Part 1 - Volume 1, we particularly endorse MDC recommendation #7 on page 4-31:

"Under the provisions of Public Law 95-217, it is recommended that the MDC seek a waiver of the secondary treatment requirements for the Deer and Nut Island treatment facilities until such time as EPA can demonstrate the cost-effectiveness of such an expenditure in terms of measurable water quality improvements, enhanced recreational potential and enhancement of the aquatic environmental and marine life." ⑦

RESPONSE TO COMMENTS BY ARTHUR BARNES

1. While we agree with the quoted statement to a degree, we must insert a cautionary note, similar to several raised in the comments made to us: P.L. 95-217 set national standards to make implementation possible, and the requirement is not on EPA to prove that there are water quality improvements with secondary treatment, but on MDC to prove that there will not be such improvement . The EPA analysis is defined to be cost-effectiveness, not cost-benefit, because of the national standard which applies in all but a few special cases. Given the history of water pollution control, such an approach was required.

CLEARWATER CONSULTANTS, INC.
SUITE 50
551 BOYLSTON STREET
BOSTON, MASSACHUSETTS 02116
TEL. (617) 267-2990

October 6, 1978

Ms. Caroline Isber
Council on Environmental Quality
722 Jackson Place, N.W.
Washington, D.C. 20006

Dear Ms. Isber:

Please find attached a resume of the comments I delivered at the public hearing on "Scientific and Technical Evaluation of the Environmental Protection Agency's Wastewater Treatment Facilities Grants Planning Process--Boston Case Study" held September 27, 1978, in Room 2003 of the J.F.K. Federal Building, Boston, Massachusetts.

Sincerely,

W. Gary Williams

WGW:rhw

Encl.

A STAGE-WISE APPROACH TO NATIONAL WATER QUALITY GOALS MAY BE BOSTON'S BEST PATH TO CLEAN WATER

Successful planning for pollution-abating technologies required to achieve National Water Quality Goals depends upon our ability to forecast water quality. If these forecasts are accurate, then it is only necessary to find the most cost-effective plan for achieving waters of fishing and swimming quality. On the other hand, if water quality projections are subject to great imprecision--as I believe is often the case for complex, polluted natural water systems such as the Charles River and Boston Harbor--it may be sounder to adopt a stage-wise planning and implementation process for cleaning them. In a stage-wise approach, each state of abatement would focus on the current pollution problem of the largest magnitude. At the completion of one stage, the next would be planned incorporating increased knowledge of the waters and water quality improvements accruing from previous clean-up efforts. National Water Quality Goals would be achieved gradually through the cumulative effect of successive improvements in water quality.

As an example of how water quality modeling determines pollution-abatement technologies, let us use a recent analysis of water quality in the Upper and Middle reaches of the Charles River [An analysis of water quality goals and objectives in the Boston metropolitan area, Environmental Research and Technology, Inc., Concord, Massachusetts]. The study projects poor water quality resulting from discharges of proposed treatment plants, combined sewer outfalls, and urban runoff; in order to achieve National Water Quality Goals it proposes alternate abatement technologies including land application of treatment plant effluent and intensive street cleaning. These conclusions and recommendations are based on water quality projections derived from an extremely simplified model for phosphate concentrations which may lead to obnoxious algal blooms.

The Charles River flows through a series of impoundments, lakes, and wetlands. In each of these aquatic environments phosphate concentration of the river water is determined by exchanges of phosphate between reservoirs naturally residing in plants, animals, detritus, and sediments. For example, over wetlands phosphate may be removed rapidly from the river water to the sediments because detritus falls quickly through the shallow water column to the muddy bottom, where it is immobilized. It does not seem reasonable to assume, as the study does, that phosphate behaves identically in all sections of the Charles River.

Besides imprecise knowledge of phosphate assimilation within the river system, the magnitude of future sources of phosphates also must be subject to uncertainty. All of these uncertainties should be reflected in the water quality model projections by presenting a range of potential water quality conditions, so that the accuracy of the water quality forecast may be ascertained. For the study cited, it is very probable that water quality projections are imprecise; at different points along the river, actual water quality could be much better or much worse than forecasts indicate.

If at this time there is great uncertainty in projecting water quality for the Charles River, then perhaps this must be acknowledged within the planning process: that attainment of National Water Quality Goals will be achieved at some unspecified time in the future, and not within a relatively short time period. Rather than attempting to abate simultaneously all sources of pollution, the planning process should make treatment of gross pollution problems its first objective, with attainment of National Goals reserved for later stages of pollution abatement. Stage-wise planning would allow plans for each successive stage to be tuned according to new information about sources of pollution, new knowledge of natural assimilation processes, and water quality trends attributable to previous stages.

For the Charles River this approach might allow for an initial step of attacking point sources of gross pollution, such as inadequately treated sewage and combined sewer outfalls. After Completion of that step, an analysis of remaining pollution sources and water quality trends could be used to plan the second stage facilities and non-structural solutions.

The success of stage-wise planning would be contingent upon acquiring new attitudes toward attainment of National Water Quality Goals and gaining better, more detailed information about the aquatic environment we are trying to improve. Our sense of urgency about National Goals must not be lost, but our anticipations must be tempered according to the depth of current understanding about the aquatic environment. Technical success of stage-wise planning requires expanded scientific study of the polluted aquatic environments to quantify accurately pollution sources and natural modes of pollutant assimilation. To describe water quality trends occurring when polluted waters slowly approach fishing and swimming quality, there should be designed and employed qualitative and quantitative tests able to discern gradual but noticeable and desirable improvements.

The principal benefit of stage-wise development of pollution abatement plans is that facilities and non-structural solutions would be designed from the best available information, which should be of increasing quality as implementation of abatement plans proceeds. Inappropriate or unnecessary techniques dictated by uncertain water quality projections would be avoided. Accurate information about major remaining pollution sources and natural assimilation of pollutants would aid in specifying the capacities and extent of additional abatement solutions.

RESPONSE TO COMMENTS BY
W. GARY WILLIAMS

1. The suggested approach essentially requires implementation of the best available technology in a series of cycles, with new systems added whenever they are demonstrated. This will clearly provide clean water at the earliest possible time, but at an exceedingly high cost (for example, a natural first strategy would be sewer separation). While the existing models are not particularly accurate, we do not see the advantages of cleaning up points which have not impacts while ignoring the larger problems which could lead to benefits. To use one of the oldest jokes as an analogy, we do not see any reason to look for a missing wallet under a street lamp, but would rather take on the harder task of searching for it out in the dark, where it was lost.

Public Meeting on Federal Boston Wastewater Management Study
September 27, 1978
(PLEASE PRINT AND TURN IN AT DOOR)

NAME Jim E Murphy REPRESENTING Boston Harbor Pollution Comm

ADDRESS 15 BRANCH ST
QUINCY. MASS
02169

PHONE 472-1547

(CHECK ONE)
✓ I wish to have the floor for 5 minutes to speak
___ I do not wish to speak

(CHECK ONE)
___ Please have ________ respond to my written question or comment at the meeting
___ Please have the final contractor report(s) reflect a response to my written question or comment below

MY QUESTION OR COMMENT APPEARS BELOW:

Prepared Testimony will be Read and Copy turned in.
Because of a change in my schedule I was unable to be present at the Hearing J E Murphy

15 Cranch Street
Quincy,Mass. 02169
September 25,1978

Council on Environmental Quality
Office of Public Affairs
722 Jackson Place,N.W.
Washington,D.C. 20006

Re:- Public Meeting on Federal Boston Wastewater Management Study September 27,1978

Office of Public Affairs:-

It seems that it will not be convenient for me to attend the Public Meeting on Federal Boston Wastewater Management Study,on September 27,1978,that is to be held in Room 2003 of the John F. Kennedy Building,Government Center,Boston, Massachusetts .

As the Representative of the Boston Harbor Pollution Committee I am submitting prepared Testimony which we request to be recorded as our Committee's Position on the prevailing Pollution Condition In the Boston Harbor Area.

We trust that this is the kind of information you are seeking.

Sincerely
John E. Murphy
John E. Murphy,Representative
Boston Harbor Pollution Committee

Attached:-
Copy of Testimony

E.P.A.---- BOSTON HARBOR CITIZENS ADVISORY COMMITTEE

SUBCOMMITTEE REPORT---- AIR AND WATER QUALITY

The intent and purpose of this report is to derive a procedure to obtain the highest quality of clean air and pure water,as is possible, by locating the sources of the contamination of the Air and the Water, in the Boston Harbor Area,and suggesting the means that can be pursued to eliminate the sources of the pollution.

Quincy Bay Area,Nut Island Sewage Plant.

The outflow from the Nut Island Plant is a great contributing Source of Pollution of the water,under normal operating conditions and, also,due to break-downs and mal functioning of the plant.

The First Corrective measure is to provide adequate routine servicing and preventive maintenance to eliminate operating failures.

The Long Range Plan of development is to control the Out-Flow by constructing pipe line and/or tunnel to carry this waste out to deep water,three to five miles beyond Graves Light,to be combined with the Out-Flow from Deer Island Sewage Plant where it can be readily ingested in the greater area of deeper water.

Winthrop Area, Deer Island Sewage Plant.

The tremendous amount of Out-Flow from this Plant into Boston Harbor daily,415 Million Gallons,or more, certainly cannot continue without grave consequences to human health and the contamination of marine matter and gill fish and shell fish.

Secondary Sewage Plants will not be the answer to clean water,they may ameliorate the condition but not eliminate the contamination.

The Out-Flow from the Deer Island must be Piped or Tunnelled out to deeper water and combined with the out-flow from the Nut Island Plant to accomplish what is humanly desired and required in order to obtain the objective of Clean Water in Boston Harbor;otherwise the Beaches, both on the mainland and the Islands, will be destroyed, swimming as a--- sport and recreation will not be available in the Boston Harbor Area.

Boston Harbor is a congested area because of its many Islands, the Ebb of the Tide does not carry the sewage out-flow out into the ocean thereby,causing the Flow of the Tide to carry the pollution back into the Harbor.

Let me quote a distinguished person on this particular point:-

> " Organic nutrients resulting from the discharge of either primary or secondary effluent should not be released in any semienclosed body of water such as Boston Harbor or Quincy Bay in which the nutrients concentrations can increase to the point of using up the normally existing dissolved oxygen content of the water. "

BOSTON HARBOR &DRAINAGE AREA

Other Sources of Sewage into Boston Harbor

There is occasional and periodical permission of sewage discharge into Boston Harbor (Dorchester Bay) from the Pumping Station at Columbia Point.

This discharge, however slight or often, should not be allowed to continue. Clean water and the health of the people should and must be the first consideration.

What ever reason there may be for the discharge from this plant must be thoroughly surveyed and corrective measures taken to control the sewage at this location to eliminate the discharge.

Combine Sewage Overflow Storm Drain Water Runoff and Industrial Outflows into Boston Harbor contribute, to a great extent, to the constant pollution of the shore lines in many sections of the Harbor.

Steps should be taken to get at these sources and remedies made to correct the damaging influence of these sources of pollution.

Tide Gates, several of these are located in and around the shores of Boston Harbor and it is known that many of these are in very bad operating condition. Because of faulty operating condition Seawater flows back into the sewage system causing damage to equipment often resulting in breakdowns.

It would seem that it is imperitive that Tidegates should be eliminated from the Sewage System without any further delay, for one who has observed the outflow from some of the fidegates no time should be further delayed in rerouting the sewage from these gates into the mainstream of the sewage system.

AIR QUALITY

We are all aware that much progress has been made in controlling the filtration of smoke from Industrial Plants; similarly, automobile emissions have been under scrutiny for several years with much progress toward clean air, this is true in those autos using gasoline. but from observation it appears that not much is being done to supervise and control emissions from Autos and Trucks, etc. using Diesel Fuel in Internal Combustion Engines (motors).

Closer scruriny should be exercised in those areas of motoring particularly those using Diesel Fuel.

INCINERATION OF SEWAGE WASTE (SLUDGE)

This form of disposal of sludge should not be permitted, since its process could be a source of great danger to the Health of the people.

The Fly Ash that will be produced from the burning and the residue that will result must be carted away for disposal as land fill are problems that defy adequate solutions.

The prevailing Winds over Boston Harbor are North by Northh-East and East by South-East usually damp and heavy which would cause the smoke from the incinerator to lay low over the inhabited area thereby being a menace to health,particularly breathing ailments

Then there is the danger from Fly Ash;Fly Ash is the product that is produced from the smoke in the Smoke Stacks which must be removed and disposed as land fill,it is difficult to transport and to handle.

Incineration should not and must not be adopted as a means of disposing of sludge or anyother waste from Sewage Filtration Plants, in the Boston Harbor Area.

We must not recommend the destruction of Sludge until we are certain whether or not it can be successfully used as fertilizer for lawns,gardens,etc.

Submitted by:-
John E Murphy.
John E. Murphy,Representing
The Boston Harbor Pollution Committee

September 25,1978

(3)

Statement of Lydia R. Goodhue on the Boston Wastewater Management Planning Case Study. Boston, Massachusetts , September 25, 1978.

I am Lydia R. Goodhue, 90 Dover Road, Wellesley, Massachusetts, 02181, speaking as an individual, though I am the representative of The Charles River Watershed Association on the EPA's Boston Harbor Citizens' Advisory Committee and immediate past Chairman of that committee. I have read most, but not all of the four volumes. At first I did not like the idea of spending federal money merely to look at a decision being made, when there seemed to be such a crying need for more direct help. But the report has been useful in asking the key questions and in opening up options, and in highlighting relevant situations.

You may know that the various members of BHCAC have been asking many of the same questions for many months, even years. Many of these questions have been answered - many are still unanswered, even after your report.

There is one aspect of the report which troubles me, and that is that the cut-off date for background information goes as far back as 1976 in some cases. It is hard to know whether some of the information and some of the criticisms are still valid. For this is a fast-changing field. What with new and emerging technical solutions, and with new and emerging public attitudes, and new and emerging federal regulations, some documents which are only a few years old sometimes read like documents from another era.

A few comments.

Wastewater Treatment Facilities Planning

Regarding expansion of the MSD, which I oppose given its present surcharged condition, it is good to see (p.4.36) your observation that no community should be added to the MSD by the EMMA proposal was found to be discharging raw sewage at present. And it was good to see the key observation (4.37) asking if a regional agency should annex new communities before fully serving the needs of its present member communities. To which I would ask if even a single mile should be added even within member communities as long as the system is operating beyond design either at the plant or in the collection system.

It is news to me that the chlorination-detention facilities have not been effective (S.7). Also that snow dumped into combined sewers is damaging to a treatment plant (S.3). We have been told that good I/I controls can seriously reduce needed expansion of a system such as ours (S-9) . Also, it is true that there has been little or no thought to conservation (S-11) and, as a citizen I have felt naive to hope that a real conservation program with teeth could further reduce needed expansion. It has seemed unreal that we are proposing to transport and treat so much precious potable water and that we are taking as "normal" so much groundwater and saltwater inflows.

Meantime, as you suggest and we have known also, the existing collection system is in bad need of repair.

Institutional Aspects

I agree that the A95 review is not effective. It does not seem to be conducted with much public input either. Also I agree that the 208 study is too accepting of the EMMA Plan (p.7). The NPDES program has, indeed , been used as an incentive to foster 201 grants (8) and the consultants do indeed tend towards conventional solutions (8), often leaving semi-ignorant citizens and a few agency people to ask the unconventional questions. Fortunately this no longer will be true, judging from the Clean Water Act and its emerging regulations and guidelines.

I hope we will have more public input, also, into the State Priority List, which is still somewhat of a mystery to citizens.

We have discussed in BHCAC the problem of operation and maintenance many times, a problem which will continue in the future and which would be greatly helped if the federal grant programs, which even now tend towards the project phase, were to also handle the areas of operation and maintenance and of repairs and rehabilitation. ①

There should, indeed, be public participation in Step 1. I feel that there should even be some assurance that there was public participation in the pre-application period and asked Douglas Costle about this at a conference. He said, however, that it was not possible for EPA to require anything of the grantee such as this before he applies. ②

You make the interesting observation (13) that sometimes the citizens are the ones who are asking the larger questions. Here is the largest question of all: In an era of emerging support for imaginative alternatives to conventional wastewater treatment (where even the term "waste-water" is becoming an anacronism), are we in the Boston area designing and shepherding through the various processes the last of the old-fashioned behemoths? ③

Sludge Management

I agree that Massachusetts should have a sludge management program. At the moment the forces which want to use sludge as a resource seem to be at odds with the regulators of solid waste and I hope that very soon the matter will be solved as to whether sludge is a hazardous waste. And I hope that the matter will be soon solved as to whether cadmium is an insuperable obstacle to land application, as was implied by a federal solid waste official at a recent Technicology Transfer meeting.

Of the 9 alternatives posed by your study, I am disappointed that you paid so much attention to two ocean sludge disposal alternatives which are totally unacceptable to me. Surely it is not practical to suppose that all but two elements of the sludge can be removed, thus producing a sludge disposal mass which is positively good for the ocean. And, besides, as with talk of putting effluent into the ocean, I am uneasy about the suggestion (5-29) that the policy to ban ocean disposal has "little scientific reason". I fear that we will all live to see the day when the polluted ocean is our main concern, remembering that engineers of good will and training did , several decades ago, design the polluting systems which we have today which are putting effluent and sludge into the nation's streams, lakes, and harbors.

I feel uneasy about incineration because of its air quality problems, notyet solved, apparently. Also, I am a great enthusiast of using the resource value of sludge where possible through composting or land application and am pleased to see the MDC's interest in composting and hope that it will continue and expand. Your report makes a good point that the MDC is uniquely able to use the end product on parklands and harbor islands, and I am intrigued with the suggestion that MSD member communities might be required to accept compost for their parks, etc.

One of the values of using sludge is that it replaces a certain amount of petro-chemical materials now being used and therefore when you pose the question (3.55): Is reduction of air pollution through composting worth $6/ton?, be sure to include on the benefit side the fact that each ton of compost material reduces our dependence on petrochemical material.

I would like to see serious consideration to co-incineration of solid waste and resulting generation of power and cannot believe that one of the impediments is that there is not enough solid waste, when our society seems in danger of inundation by solid waste.

Meanwhile, I suggest that the sludge dumping into the harbor be stopped now, even if it means using drying beds at Deer Island or elsewhere until a better solution is found and using more composting. I do not know if the upcoming Final Sludge EIS for Primary Sludge will include a composting element (BHCAC has requested it, but our knowledge of the contents of that EIS as it is being amended is not good.

Water Quality Goals

I agree that we should assume seimming/fishing water quality for Boston Harbor (p.4). And I applaud your statement (10-2) that the objective of water quality management is not a structure but clean swimming/fishing quality water. It seems to me to be perhaps the most important statement which I read in the study. We should emphasize and give priority to actions which will actually take care of the sources of pollution of the harbor:

Primary sludge
Combined sewer overflows and tidegates
Sewerline and facilities operation, maintenance, and repair and rehabilitation
The surcharged MSD system, reducing the volume by
    1/1 control, conservation, moratoria, and diversion of upper-watershed sewage to other treatment locations and modes
Urban run-off

I am wary of using the nearby ocean as an excuse not to treat with secondary treatment, as all inland communities have to, but I do not think that the facility should be designed as a substitute for taking of the problems listed above.

And, finally, I share the report's fear (10-7) that implementing EMMA (or something similarly massive and expensive) will foreclose other solutions for the remainder of this century. However, I gather that EMMA as an alternative is not in serious contention, since so many segments of it have been questioned by both the Draft Upgrading EIS and by the 208 Areawide Plan, as well as your own report.

RESPONSE TO COMMENTS BY
LYDIA R. GOODHUE

1. We agree that O&M is the most significant problem for the next decade.

2. Step 1 public participation is being proposed by EPA. Your point on the preapplication period is an important one, and EPA could suggest such activities in its suggestions for preapplication actions.

3. We will assume your question is rhetorical, but believe that it should be a concern. We do not have an answer.

Statement by Howard Ris, Jr.

Submitted to the

Federal Interagency Study Team

Boston Case Study, EPA Construction Grants Program

September 27, 1978

My name is Howard Ris, Jr. I am a professional environmental planner and a citizen member of EPA's Harbor Pollution Advisory Committee. Up until last May, I was a Senior Planner with the Massachusetts Coastal Zone Management Program, where among other duties, I had principal responsibility for coordinating CZM program development with the state's 201 construction grants program and the regional 208 programs. I appear here today as a citizen concerned with the future of Boston Harbor.

The Study's consultants should be commended for a most thorough and objective analysis. As with all reports of this kind, however, I am sure their findings will be criticized for being out of date and over-simplified. Hopefully such criticisms will not lead to complete disregard of the study's principal conclusions, which I believe can be of substantial use to the Massachusetts agencies involved in water quality management, as well as EPA.

Detailed, page by page comments follow below.

USRE: Institutional Aspects of Wastewater Management
The Boston Case Study - Draft 1978

p. 7 I concur with the recommendation that EPA require Basin Plans to be prepared consistently with federal regulations, including the development of wasteland allocations. As the report notes, there is currently little coordination between Basin Planning and the award of construction grants. ①

p. 9 I concur with the recommendation that DWPC should assist communities in evaluating innovative alternatives at an earlier stage. DWPC's contention has been that its enabling legislation precludes it from getting too involved in facilities planning. This inadequacy is further reinforced by the federal/state/local funding split of the three-step process wherein DWPC does not contribute step 1 funds. ②

p. 11 Support the recommendation that alternatives be fully analyzed, as well as total costs presented. The Report rightfully points out that MDC improvements will consume all or more of the state's 201 allocations over the next few years. How will this be reconciled? It would seem logical to plan for this circumstance now rather than wait until the MDC projects make it to the top of the priority list. ③

pp. 12-13 The Report's conclusions regarding the inadequacies of existing maintenance and operation programs is particularly relevant to MDC's current waiver application. Is the MDC capable of properly operating ④ an upgraded primary treatment plant to a degree sufficient to meet the conditions of an approved waiver?

p. 14 Support the overall recommendations for improving consistency of construction grants and planning programs, increasing local flexibility in the implementation of facilities and controls, and increasing local incentives for effective operation and maintenance. ⑤

p. 19 Mention should be made of the recently approved CZM program which imposes certain consistency requirements on 201 facility planning and construction. See Policy 26, p. 95 of the 1978 Mass. CZM Program. ⑥

p. 38 **I concur** with the Report's conclusion that coordination of growth policy in Massachusetts is difficult. In spite of OSP's efforts to bring the priority list in line with state growth policy and the obvious relationships between growth and water quality, DWPC continues to contend that its mandate precludes consideration of growth policy in developing the 106 priority list. More specific guidelines from EPA would help to clarify DWPC's latitude in this area. ⑦

p. 39 How are "Older Urban Core," "Suburban," and "Rural" defined? ⑧

p. 44 The recommendations concerning A-95 review appear to be contradictory. Does it or does it not function well? One means of improving its effectiveness would be to require DWPC to publish periodic status reports listing the current step and schedule for completion of each project being funded, so that reviewing agencies could adjust their review schedules accordingly. ⑨

pp. 48-55 **I concur** with conclusions on inadequacies of MAPC's 208 Basin Plans and the chaos created by the lack of timely and useful guidance by EPA. ⑩

p. 75 **I concur** with the recommendations with respect to the importance of the Basin Planning process and the need to ensure that all required elements are completed. What changes in the allocation of federal funds are needed to accomplish this? The recommendation suggesting that level B studies be used to establish specific goals and the tasks to be accomplished through individual 208 grants would eliminate much of the redundancy between the level B and 208 programs and provide for more expeditious resolution of water quality problems. The recommendation that 208 plans be approved prior to approval of new 201 grants should also include explicit stipulations as to how future 201 plans must be consistent with 208 recommendations. ⑪

p. 79 "...MDC will not be eligible...to gain an exemption from the secondary treatment requirements...given the legislative history of the Section" -- this point should be reviewed in relation to MDC's waiver application. I assume it refers to the differences between East and West Coast receiving water depths. ⑫

pp. 79-81 The Report's conclusion that enforcement of NPDES permits is overly dependent on construction grants is well taken. However, an additional point might be made -- construction grants could be used more beneficially as an enforcement mechanism if EPA and DWPC more actively considered funding less costly alternatives to conventional ⑬ systems as called for in the recent Clean Water Act amendments. In addition, a chart showing which conditions of MDC's current NPDES permits and the ECSL have been met and which stipulations remain unenforced would be instructive as well as improve the public accountability of the agencies involved.

p. 87 I concur with statements pertaining to the preparation of the priority list by DWPC and the lack of coordination with Basin or 208 plans. What are the implications of this in terms of EPA's funding priorities for the three separate processes? In addition, the report should address the statutory problems inherent in the relationships between the Executive Office of Environmental Affairs, MDC, DEQE and DWPC. DWPC's enabling legislation places it within DEQE under the Executive Office, but mandates that the Division be subject to the independent control of the Water Resources Commission, composed of seven members, one of which is the Secretary of EOEA. This design unfortunately separates 208 planning and enforcement of sub-surface disposal by DEQE from basin planning, facilities planning and NPDES enforcement conducted by DWPC; causes divisiveness on policy questions; and results in needless "turf" battles among the agencies. This arrangement also, I would assume, impedes the ability of EPA to coordinate its activities with the state's. This situation may be somewhat rectified by the state's recent delegation request to EPA, which would give DEQE more planning responsibilities. ⑭

pp. 88-90 DWPC's recently revised priority list criteria should be discussed here, including an analysis of their potential effectiveness in encouraging alternative systems. (A,D)

p. 90 Mention should be made of the lack of WPC involvement in facilities planning prior to submission of the final plan and step 2 application as noted in the comment referring to page 9 above. One of the principal recommendations of a Priority System Review Task Force convened by the Director of DWPC last year was that DWPC should greatly expand its role in working with communities and their consultants in the early stages of facility planning. The report should discuss any progress made in this area. ⑮

p. 93 I concur with the recommendation that enforcement be conducted independently of construction grants and that delays in obtaining grants not be used excessively as excuses to delay enforcement. This is the single most important recommendation of the report and if implemented would go along way toward reaching water quality goals. Reducing the dependence of enforcement on construction grants may may pose substantial financial burdens on communities, but would provide tremendous incentive for implementing non-structured solutions such as rehabilitation of failing septic systems. ⑯

p. 94 I concur with the recommendations re: greater consideration of non-conventional systems. ⑰

p. 97 I concur with the recommendations re: improved performance of consultants. ⑱

ERT: An Analysis of Water Quality Goals and Objectives in the Boston Metropolitan Area - December 1977

p. x The report cites several deficiencies in the establishment of water quality standards by DWPC. The revised standards promulgated in the past year should be reviewed to determine if the deficiencies have been corrected. Why was enforcement action never taken by EPA to correct the problems identified prior to this time?

p. xiiii The report states: "No evidence was found in the Boston area of a serious concern about either compliance with or enforcement of Section 303." Why has this occurred?

p. 1-8,9 The report raises grave questions concerning the proposed construction of additional Detention/Chlorination faculities based on the design of the Cottage Farm facility in the Charles which reportedly has proven to be totally useless in correcting combined sewer overflow problems. If ERT's analysis is correct, why is the construction of such facilities proceeding at the Warren Avenue Dam, and what steps have been taken to recover funds wasted on the Cottage Farm facility?

p. 1-15 The report's recommendations concerning installation of a sewer flushing system and an intensive urban street cleaning program should be actively considered in any future facility plans for correcting combined sewer overflows and runoff problems. Perhaps special funding could be obtained from EPA for demonstrating these technologies in a pilot study area while the recently initiated CSO sampling studies are being conducted.

p. 1-18 The report's concerns regarding the ineffectiveness of chlorination disinfection and the proven carcinogenic effects of chlorinated organic compounds discharged by such systems appear to indicate that we are well on the road to substituting one environmental problem for another. If the report's assumptions in this regard are correct, EPA should conduct an immediate review of the detention/chlorination systems now in operation or under construction in the metropolitan area and should ensure that full consideration is given to alternative methods in the ongoing CSO studies.

p. 1-39 A quote on this page is worth repeating: "If the Boston area assumptions about the effectiveness of chlorinating very poorly treated sewage are in error, or if the chlorination practiced is discontinued because of toxicity or other hazards, then the EMMA plan will result in no water quality benefits anywhere in the Boston area."

p. 3-6 The report cites major flaws in EPA's acceptance of the EMMA study as the 303 water quality management plan for the metropolitan area, since it deals with wastewater management instead. What steps can be taken to rectify this situation? Are 303 plans prepared for other regions of the state any better?

p. 4-19 With reference to water quality conditions in Outer Boston Harbor, the report states: "Bacterial concentrations are consistently in violation of the Class SB water quality criterion throughout most of this section." This statement appears to be in direct conflict with recent sampling conducted by Metcalf and Eddy for MDC's waiver application and should be reviewed in that context.

p. 6-1 "In the course of a 2-year, $2 million wastewater management study ending with a recommendation for an additional expenditure of nearly a billion dollars of public funds, not one sample of water or wastewater was collected, examine or analyzed." This is a frightening statement. The implications of such irresponsibility have become evident with the results of the sampling conducted for MDC's waiver application, indicating that pollution in the outer harbor is not as bad as previously assumed.

p. 7-4 "The discharges to receiving waters of untreated urban stormwater, raw sewage bypasses and combined sewer overflows constitute (1) the most serious of the pollution problems in the urban waterways of the U.S. (Boston included)..." Why then do CSO projects continue to get less points on the state's priority list than wastewater treatment plants?

p. 8-3 The examination of alternatives should include the all Deer Island proposal, recently recommended by EPA in the draft upgrading EIS.

pp. 10-2 - 10-3 The report's conclusion that the basis of systematic and comprehensive water quality management planning lies in compliance with the requirements of Section 303 is well advised. However, it would be instructive if the researchers had probed farther into why the 303 system has failed, and what specifically could be done to improve its effectiveness. Similarly, they cite lack of water quality data as a principal problem, but do not address the reasons why such data was never collected. If it is a matter of cost, the report should recommend that more funding be targeted in this area. (19)

p. 10-4 The discussion of regionalization should be updated to include an analysis of how the Clean Water Act Amendments will or will not encourage decentralized, non-structural pollution control. (20)

p. 10-5 The report's recommendation that federal funds be earmarked for CSO and urban stormwater control demonstration projects should be actively pursued. (21)

RESPONSES TO COMMENTS BY
MR. HOWARD RIS, JR.

1. No response necessary.

2. No response necessary.

3. See comments by Region I for some information on reconciling the MDC's projected expenditure with the total state grant.

4. We do not know the answer to your question, but believe that it is significant.

5. No response necessary.

6. While the final CZM approval was outside of our analysis period, we agree and have footnoted this change in the text.

7. Such guidelines appear to be being developed, in the recent revisions of the Construction Grants regulations. See 40 CFR 35, Appendix A (43FR44807) for information on current requirements for population projections.

8. The categories are those used by O.S.P. for their regional population projections.

9. We found the A-95 process to be somewhat contradictory, since A-95 review itself seems to accomplish little, but the necessary coordination occurs. Your recommendations seem to require little effort, yet to provide a great deal of information, and appear sensible.

10. See the footnotes to this section, based on more recent activities of the MAPC and communities.

11. The "State Management Assistance" under the recent construction grants revisions may provide more funds for basin planning. We are afraid that 208/201 consistency is likely to be achieved through revisions to the 208 plan, rather than changed in the 201 projects.

12. See revisions to text (which should simply say that MDC has applied for a waiver, and revise to state that the discharge depth thing was what we were referring to).

13. We do not understand the comment about enforcement and less-costly alternatives. With respect to the requested charge, given the ongoing revisions to the permits, a chart based on our study timeframe would not be useful for current planning. However, such a chart should probably be developed for the BHCAC.

RESPONSES TO COMMENTS BY MR. HOWARD RIS, JR. (Continued)

14. Clearly, the funding priorities are for wastewater treatment facilities, as has often been stated.

To the extent that internal organization was significant in affecting the implementation of Federal programs, we have attempted to describe it, and we agree with your comment.

A,D. They have been referenced in the text. However, we cannot speculate on the "potential effectiveness" of changes occurring outside our study's time frame.

15. As seen in the comments by DWPC, they claim to have made significant progress in involving themselves in the planning process at an early stage. This change is outside our time frame, but has been referenced.

16. No response necessary (except that maybe compliance penalties are a suggested way to do this).

17. No response necessary.

18. No response necessary.

19. We believe that Section 303(e) has failed simply because complete and effective basin plans will only make facility planning more difficult, and the major goal of the process has been to build facilities, and not necessarily to clean water in the most effective manner. The combination of incomplete 303(e) plans and difficulty in gaining grants for anything but conventional solutions has possibly been a fatal one.

20. To a certain extent, this is outside the study time frame. However, increased funding eligibility for decentralized solutions should lead to greater implementation of such solutions.

21. No response necessary, except agreement.

308 Boylston Street
PO Box 17326
Boston, MA 02117

18 Oct 78

October 11, 1978

Ms Caroline Isber
Council on Environmental Quality
722 Jackson Place, N.W.,
Washington, D.C. 20006

Dear Ms Isber

As requested by Secretary Evelyn Murphy at the Public Meeting held in Massachusetts on Wednesday, September 26, in the J.F.K. Building, Boston; I am sending the following observations.

I would like to urge, as did another member of the Public, a Mrs Baron, I believe; that full use be made of the available expertise from the Public Sector--they have until now experienced the utmost difficulty in obtaining satisfactory replies to their very real, well researched questions on some of the decisions and actions of Federal and State agencies involved in Water Pollution Control.

Many people have experienced total disenchantment with the Agencies and their Consulting Engineers. To quote from part of the OBM report: "The entire E.P.A. process, the authors of a section on inter agency relations said, gave engineering firms "an incentive" to propose secondary treatment plants rather than alternative water-control methods because their higher cost could "lead to larger fees than the alternative options". ①

While I was a member of Marblehead's Sewer Study Committee, it was discovered that the Town's Engineering Consultants at that time had done studies, including dye tests, at Marblehead's present ocean outfall. The results showed no adverse effects on the ecology, nor any return to shore of the effluent.

This report was buried, and when treatment became mandatory some years later, for some reason the Town's Consultants were changed and the new firm received considerable sums to prove that it was necessary for M'head to reverse it's largely gravity flow system to a good, open ocean outfall, and build for 7½ million dollars, a pumping station and 4½ mile pipe line over to Salem, a shallow, tidal harbor. The result is really an expensive 'holding tank'.

My indignation at hearing the same firm is now under lucrative contract to the Boston M.D.C., to quote from the Boston Globe "to marshal scientific data to show there would be no ill effects on the marine environment" - this in endeavor to qualify for a waiver to exempt Boston from Secondary Treatment. ②

Professor Trurn, who also spoke at the September 26 meeting, came to M'head and urged our committee to do all we could to prevent the carrying out of this South Essex Sewer Connector plan. He felt the need for 2ndary Treatment for Coastal towns was already being questioned, and believed M'head, with it's limited population and largely domestic sewage, was an ideal place for an experimental system either his own, or one of the new Biological nutrient and water conserving type of systems rapidly becoming available and needing suitable demonstration communities.

I have documentation of the years of effort our group put in; the group consisted of experienced people, Registered Engineers, Chemists, Financial experts, a Conservation Commissioner, a Selectman, even the Towns Sewer Superintendent. We hired, at our own expense, a reputable Environmental Lawyer...but all to no avail. Rather than burden you with reams of documentation, I am sending one document only, which I hope shows our serious intent.

Had we had unlimited funds and time, we would have gone to court, but the pressure of [illegible] huge fines (made by one of the officials present at September meeting) scared off local support, plus the fact that the obvious site for an In Town plant happens to be on an area where very wealthy and politically influencial people live--and who wanted no Treatment plant in their area; swayed the Town Meeting Vote, and we lost.

If a vote was taken today, the results would be very differant.

I vividly recall two incidents during our fight. One remark, made in confidence, by a very senior officer in the State EPA, when it was explained what the plan for M'head was, said "they are out of their minds"....but no action resulted. The second, after a long, and we hoped, successful attempt to stop the permit for the Salem plan, at a meeting with the Corps of Engineers--after the meeting, one of their lawyers was heard to remark "we are only Rubber Stamps here!".

③

Nobody makes better watchdogs, fiscally or environmentally, than the people who live in the area involved. It is unrealistic to expect distant agencies to make informed decisions, so they have to rely on Consultants, who are in it for the money. So once again I urge to make use of Citizens with no axe to grind.

If our experiences can in any way help prevent similar disastrous projects, then all our work and frustration and expense will not have been in vain.

Wishing you and your staff every success in the very difficult but so urgent task of conserving our precious water and Quality of life in general

Yours Sincerely

Margaret E Hulls

Margaret Hulls

enc.

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COUNSEL

16 June 1976

John A.S. McGlennon
Regional Administrator
Environmental Protection Agency,
Region I
JFK Federal Building
Boston, MA 02109

Re: South Essex Sewerage District
(Marblehead Connector

Dear Mr. McGlennon:

I take this liberty of supplementing my clients' previous submittals on the proposed pipeline to convey Marblehead sewage across Salem Harbor to the South Essex Sewerage District plant. This letter on legal matters surveys the exact nature of your agency's (and the Corps of Engineers') failure to consider the alternative of an in-Marblehead treatment plant, the specific NEPA provisions and agency regulations violated, and the likely response of a federal court on review. A conclusion details the essential action requested of you.

I hope this information assists your evaluation. Your staff was most impressive at our recent meeting in their willingness to take a fresh look at the rather embarrassing performance by the pipeline sponsors and their engineers. You are faced with curing defects in the environmental analysis behind the EPA grant and Corps permit applications for this project, defects which never should have reached your agency.

Thanks for your help.

AGENCY FAILURES TO CONSIDER THE IN-MARBLEHEAD ALTERNATIVE

The Metcalf & Eddy March 7, 1975 Facilities Plan admits to only summarizing the alternative wastewater management plans (p. 1-2). The "summary" occupies but two-and-one-half pages (pp. 2-1 to 2-3). Data from the 1970 M&E study are incorporated wholesale, but only by reference,"to avoid duplication" (p. 2-1). This incorporation by reference is extended also to the details of each alternative plan (p. 2-3). The total identification and discussion of alternatives is accomplished with no current effort, no current analysis, and indeed no environmental analysis at all. Moreover, it is apparent that even in 1970 the in-Marblehead alternative was discounted by M&E solely for economic reasons and, even on that score, it was close (p. 2-3). The entire listing, discussion and rejection of all management alternatives is accomplished in three-and-one-half pages. Only alternative routes for the pipeline approach are treated in any detail, in seven pages (pp. 2-4 through 2-10).

The M&E March 7, 1975 Environmental Assessment reaffirms the nearly total debt to the 1970 M&E report as a "principal source" of technical information. The only other principal sources are said to be the contract drawings and the Marblehead Comprehensive Plan (p. 4-1). Unlike the Facilities Plan, there is no mention of any alternatives except alternative routes for the pipeline (pp. 7-1 and 7-2). The assessment of environmental benefits focuses on abating the present raw discharges from Marblehead but, to carry this off, the report analyses the present discharges as if they are to Beverly-Salem Harbor, a patent error (pp. 5-1 to 5-2). Not discussed at all is that the present outfall in fact discharges to deep, cool, well-flushed Atlantic Ocean waters. It is south of town, not north, and easily usable for a Marblehead treatment plant. The Department of Natural Resources' "Study of the Marine Resources of Beverly-Salem Harbor", cited by M&E to establish that the harbor resources are worth protecting, in so doing confirms that they are worth protecting from the proposed pipeline through their midst. The impact is casually dismissed as minimal, however, because of so much clean water already in the Harbor (the "dilution" factor), because there are "no known harmful deposits" or sediments in the bottom of the Harbor to be stirred by pipeline construction (a not unexpected statement since there were no studies to find out), and because large breaks in the pipeline during operation will be identifiable by fish kills (an interesting indicator to use)(p. 6-3). There is no acknowledgement that all these adverse impacts will be eliminated in toto by an in-Marblehead alternative, while accomplishing all the benefits of the pipeline to Salem, especially abatement of Marblehead's raw discharges.

The October 24, 1975 EPA Negative Declaration makes no assessment of any environmental issues, but instead cites a separate Environmental Impact Appraisal (no date). The Appraisal adopts wholesale the M&E Assessment, which without further comment is found adequate as discussing "the majority of environmental factors." The EPA Appraisal does not adopt the M&E Facilities Plan even though it, not the Assessment, contains the only mention of management alternatives. The EPA Appraisal does have a supplemental "discussion" which adds no environmental analysis of alternatives but only defers totally to unidentified and even undrafted provisions in a Corps of Engineers permit as justification for the EPA to say that "we feel" the comments of several state and federal agencies will be addressed and adequate safeguards will be required (p. 2). "Potential problems involving siltation, turbidity, disposal of spoil, floating debris and navigation should be adequately minimized by conditions of the permit," the Assessment observes, but that is the full depth of analysis. No discussion is had of the Massachusetts Coastal Zone Management Program condition on its concurrence in the project: that various methods of dredging be examined to determine which process will minimize the siltation-sedimentation problem for the harbor; that dredge spoil be tested prior to the project starting, to determine if it is polluted with heavy metals or insecticides; and that polluted spoil may warrant special disposal precautions (Keefe letter to Grinnell, April 25, 1975).

Examination of the EPA file discloses four other characteristics of the EPA consideration of this project. First, Mr. DePalma's letter to Selectman Thomas Jordan (December 18, 1975) illustrates that EPA has misconstrued the burden under NEPA as being on those who question the project and the Environmental Impact Appraisal: "since nothing to the contrary has been presented to us, the Environmental Protection Agency will not require an Environmental Impact Statement." Secondly, the minutes of a 1973 meeting of Marblehead Sewer Department officials with EPA and state water pollution control officials divulge that the EPA never intended to do an independent study of alternatives as required by NEPA: "[t]he federal authorities would have funds for studies of this type but since Marblehead has had two previous studies [in fact, only one, and none with the requisite environmental analysis], they would be unwilling to fund another one" (Memorandum Re: Meeting of Department of Water Pollution Control, May 11, 1973, para. 3). Thirdly, Mr. DePalma's September 23, 1975, letter to Margaret Hulls confirms that there was a two month delay in EPA receipt of the transcript of the local public hearing on the project. Apparently, contrary to the June 1975 Notice of Public Hearing, the "minutes of the hearing" never did become part of the M&E Environmental Assessment or part of the state and federal construction grant applications. Fourthly, the EPA Environmental Impact Appraisal (p. 2) confirms that the EPA has assumed that the sponsors of this project will need a Massachusetts Division of Waterways tidewater dredging permit, with the attendant procedural precautions and substantive conditions. Also, any work under the Corps of Engineers permit recently issued reportedly is expressly conditioned on the South Essex Sewerage District first obtaining that state permit. In fact, the District is now claiming exemption from General Laws Chapter 91, as well as from the Massachusetts Wetlands Protection Act, Chapter 131, Section 40. If there is no proper NEPA review of this project, then there is a good chance that no state Division of Wetlands, Division of Waterways or Massachusetts Environmental Policy Act review will rectify the defects in the environmental analysis of this project.

APPLICABLE NEPA PROVISIONS AND AGENCY REGULATIONS VIOLATED

There can be no debate that NEPA itself requires the EPA to consider the in-Marblehead alternative. Analysis of project alternatives is a critical element of NEPA (§102(2)(c)(iii) and §102(2)(D)). These requirements have been read to obligate the agency to fully present options other than the one favored by the agency. The range of alternatives which must be surveyed extends from taking no action at all to adopting another alternative fully accomplishing the purposes of the project without any of the objectionable features. E.g., EDF v. Corps of Engineers (Gillham Dam), 325 F. Supp. 728, 761, 1 ELR 20130, 20142 (E.D. Ark. 1971); 115 Cong. Rec. S. 40420 (December 20, 1969), statement by Senator Jackson. The depth of the analysis of alternatives must be adequate to permit the reviewer to make a reasoned choice. NRDC v. Morton, 458 F. 2d. 827, 836, 2 ELR 20029, 20033 (D.C. Cir. 1972).

This latter case also suggests that time delay in agency compliance with NEPA will not work to relax NEPA application. Where the Department of the Interior had delayed until alternatives to offshore oil and gas development were narrowed by energy needs, and investment of resources committed, the Court nonetheless enjoined this major leasing program in the Gulf of Mexico to force the reevaluation of alternatives, such as alternative energy sources, which would make the offshore oil and gas leasing less necessary or unnecessary. Interior was forced to start over and conduct a full review of basic underlying policies, resource commitments and alternatives, despite the hardship.

Beyond NEPA, the federal courts will make frequent recourse not only to the CEQ NEPA Guidelines but also an agency's own substantive NEPA procedures defining agency actions to which NEPA applies and setting detailed review requirements. On this score the EPA regulations governing the grants for this project unambiguously require assessment of the in-Marblehead alternative. "Final Construction Grant Regulations," Title 40, Chapter 1, Subchapter B, Part 35 -- "State and Local Assistance."

Under those regulations an adequate assessment of expected environmental impacts is mandated, "consistent with the requirements of the National Environmental Policy Act of 1969" (§35.925-8). Facilities planning is required which will

> demonstrate the need for the proposed facilities and, by a systematic evaluation of feasible alternatives, will also demonstrate that the proposed measures represent the most cost-effective means of meeting established effluent and water quality goals, recognizing environmental and social considerations. (§35.917(b))

The most cost-effective alternative is defined as

> ...the waste treatment management system determined from the analysis to have the lowest present worth and/or equivalent annual value without overriding non-monetary costs and to realize at least identical minimal benefits in terms of applicable Federal, State and local standards for effluent quality, water quality, water reuse and/or land and subsurface disposal.
>
> Part 35, Appendix A, Par. (f)

The cost effectiveness analysis must include "[a]n adequate assessment of the expected environmental impact of alternatives including sites ..." (§35.917-1(d)(7)).

A Negative Declaration itself specifically must have a summary of "alternatives" (§6.104(e)). A bare listing of alternatives, however, does not suffice:

> This discussion shall include a comparative analysis of feasible options and a systematic development of wastewater treatment alternatives ... The reasons for rejecting any alternatives shall be presented in addition to any significant environmental benefits precluded by rejection of an alternative" (§6.512(a)(4)).

The Environmental Impact Appraisal similarly must describe "feasible alternatives" (§6.212(b)(2)(i)). The model form incorporated as Exhibit 4 of the regulations reaffirms this requirement in item 4: "Alternatives considered with evaluation of each."

Fundamentally, the EPA review must "determine whether significant impacts are anticipated from the proposed action [and] whether any feasible alternatives can be adopted or charges can be made in project design to eliminate significant adverse impacts ..." (emphasis supplied) (§6.204).

The Corps of Engineers has failed to meet its comparable NEPA obligations. "Permits for Activities in Navigable Waters or Ocean Waters," Volume 40, Number 144, Part IV, July 25, 1975.

They specify that in evaluating every application a key criterion is

> [T]he desirability of using appropriate alternative locations and methods to accomplish the objective of the proposed structure or work (§209.120(f)(2)(ii)).

Special protection is to be afforded wetlands as "they constitute a productive and valuable public resource, the unnecessary alteration or destruction of which should be discouraged as contrary to the public interest." (§209.120(g)(3)(i)). In the case at hand it has been established by a Massachusetts Department of Natural Resources study that Salem Harbor serves important natural biological functions, including food chain production, general habitat, and spawning (appropos §209.120(g)(3)(ii)(a)). In addition, the area is the site of a Massachusetts marine laboratory (see §209.120(g)(3)(ii)(b)).

The Corps' District Engineer must conclude on the basis of an analysis that the benefits of the proposed project outweigh the damage to the wetland resource and "the proposed alteration is necessary to realize these benefits." Specifically, he must find "whether feasible alternative sites are available," giving great weight to fish and wildlife considerations and urging the applicant to "modify his proposal to eliminate or mitigate any damage to such resources" (§209.120(g)(3)(ii), (iv)(a) and (4)(i)).

None of these EPA and Corps obligations have been met. Aside from the inadequacies of the Negative Declaration on the Marblehead pipeline, moreover, a good case can be made that a full EIS is required in any event, because a major portion of the pipeline will be located on productive wetlands. (EPA regs., supra, §6.510(b)), there will be a significant adverse effect on surface water quality (§6.510(f)), there will be a significant adverse effect on fish, wildlife and their natural habitats (§6.510(f)), and the impact of EPA approval is likely to be highly controversial (§6.200(b)). This is so even though the net effect of the pipeline project is alleged to be beneficial (§6.200(a)).

LIKELY RESULT OF FEDERAL COURT ACTION

The central failure of both EPA and the Corps has been to omit any rigorous exploration and objective evaluation of an alternative to the pipeline project which would avoid some or all of the adverse environmental effects. The 1975 Metcalf & Eddy Environmental Assessment makes no environmental comparison of the pipeline to an in-Marblehead treatment plant and the Assessment itself is based on the 1970 M&E report which rejected an in-Marblehead alternative solely on economic grounds, with no environmental analysis.

The EPA Environmental Impact Appraisal adopted the Assessment wholesale, adding nothing to cure the defect.

Failure to properly discuss alternatives has been fatal to Corps of Engineers' projects. *EDF* v. *Froehlke* (Cache River), F. 2d , 4 ERC 1829 (8th Cir. 1972). Unlike the plaintiffs in *EDF* v. *Corps of Engineers* (Tennessee-Tombigbee), F 2d , 6 ERC 1513 (5th Cir. 1974), the Marblehead citizens have conducted detailed research on the appropriateness of studying the alternative of in-Marblehead treatment. Its feasibility is not technically, economically, or ecologically speculative. The burden thus placed upon the Corps has not been met. NEPA Section 102(2)(D)

> ...was intended to emphasize NEPA's theme that all change was not progress and to insist that no major federal project should be undertaken without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of *accomplishing the same result by entirely different means*." (emphasis supplied). *EDF* v. *Corps of Engineers*, supra 6 ERC 1513 at 1520.

Similarly, when the EPA fails to consider alternatives to a municipal sewage treatment project, it has resulted in injunctive relief halting the grant approval. *Gibson v. Ruckelshaus*, F.Supp. , 3 ERC 1028 (E.D.Texas, 1971), reversed on other grounds sub. nom. *City of Lufkin v. Gibson*, F2d , 3 ERC 1370 (5th Cir. 1971). On the other hand, discussion of environmental effects of alternatives need only be so extensive as to permit a reasonable choice of alternatives, with reasons advanced by the EPA for its decision to reject any alternative. Such proper evaluation of the in-Marblehead alternative would render EPA immune from successful challenge. E.g., City of North Miami v. Train, F. Supp. , 6 ERC 1841, 1845-46 (S.D. Fla. 1974).

The federal courts will give special scrutiny to a Negative Declaration -- a decision by an agency not to prepare an Environmental Impact Statement. Such a decision to bypass the consideration required by NEPA usually is subject to an especially probing standard: whether the Negative Declaration is reasonable in light of the mandatory requirements and high standards set by the statute, so as to be in accordance with law. This is a lesser burden on plaintiffs than to show the Negative Declaration to be arbitrary and capricious. Eg. Save Our Ten Acres v. Kreger, 472 F2d 463, 3 ELR 20041 (5th Cir. 1973); Wyoming Outdoor Coordinating Council v. Butz, 484 F2d 1244, 3 ELR 20830 (10th Cir. 1973).

Even under the more conventional "arbitrary and capricious" standard, though, the federal courts have come close to undertaking de novo review of a Negative Declaration, and, in the leading case, the Court required public notice, public participation and a Negative Declaration close to a full Environmental Impact Statement in scope and quality. Hanly v. Kleindienst (Hanly II), 471 F2d 823, 835, 2 ELR 20717, 20723 (2nd Cir. 1972). The result under the doctrines of this decision has been at least one 142-page Negative

Declaration, seen necessary to excuse non-preparation of an EIS by the General Services Administration. First National Bank of Chicago v. Richardson, 484 F2d 1369, 3 ELR 20771 (7th Cir. 1973).

CONCLUSION

Admittedly, the project at hand is "only" a pipeline. NEPA applies no less, however, than if this were a seven million dollar treatment plant. An alternative which would make the entire project unnecessary has been ignored. This is not merely a technical deficiency. In no project document prepared by EPA, submitted to EPA or relied upon in submittals to EPA is an in-Marblehead treatment plant weighed on environmental grounds. Under NEPA and related EPA and Corps requirements this defect, unless cured, can be fatal to the project. My clients respectfully request that the EPA make or require a prompt but thorough evaluation of the alternative of in-Marblehead treatment.

Very truly yours,

Gregor I. McGregor

Hand delivered

cc: James Thompson, Asst. Regional Counsel
Morgan Rees, District Engineer

marblehead

GOOSE spokesman cites cost savings

FinCom urged to support treatment plant proposal

MARBLEHEAD — James J. Hourihan Jr., spokesman for an independent group of concerned citizens that calls itself GOOSE (Get Out Of South Essex), today called upon members of the finance committee to recommend approval of articles concerning South Essex Sewerage District and a Marblehead treatment plant that will appear in the warrant for a special town meeting Tuesday night, Oct. 25.

The finance committee has scheduled a public hearing on all articles appearing in the warrant for Tuesday night, Oct. 19, at Abbot Hall auditorium.

Hourihan said today:

"Since the cost savings and earlier on-stream time for a Marblehead plant are significant, it would seem prudent for the finance committee to recommend approval of the articles in the warrant concerning SESD and a Marblehead plant."

Hourihan released contents of a letter from a Concord, N.H. engineering firm, Environmental Engineers Inc., giving the estimated costs of a secondary treatment plant for Marblehead sewage at the Jenney site.

Hourihan disclosed that, based upon Environmental Protection Agency cost effectiveness data, capital costs for a Marblehead plant are estimated at $5,920,000, with annual operating costspegged at $382,000.

He said Marblehead's participation in the South Essex District's regional sewer treatment operation will find total capital costs estimated at $13,655,113. He notes the cost of the Marblehead connector will be $6,500,000, with Marblehead paying an additional $7,155,113 as its share of the SESD treatment plant.

Hourihan added Marblehead's share of the annual operating costs of the South Essex plant are estimated at $412,045.

The GOOSE spokesman noted that it would be possible for a Marblehead secondary treatment plant to be operating in the spring of 1978, if approval to proceed can be won in May, 1977. The SESD secondary plant won't be operating until 1981, Hourihan contends.

The letter sent to GOOSE by Frec J. McGarry, project engineer for Environmettal Engineers Inc., states, in part:

"At the request of Reginald Hartley of the "GOOSE" Committee, I am submitting this letter to you to review the preliminary cost estimate for secondary treatment for the town of Marblehead we had prepared. These are the same costs which I had presented at the finance committee meeting on Aug. 13. The estimates are based on a 20-year design flow of 3.8 million gallons-per-day. The treatment process assumed was a physical-chemical process. This was chosen since it is land intensive, with much of the process being easily housed. The unit operations assumed in the process were as follows: (1) preliminary treatment of screening, comminution and grit removal; (2) chemical coagulation with alum and settling; (3) activated carbon adsorption; (4) multimedia filtration; (5) disinfection; (6) sludge dewatering; (7) sludge incineration; (8) activated carbon regeneration.

"This treatment process was chosen since it was likely to be the most expensive in both capital and operating costs of possible alternatives. Other treatment processes could be less expensive.

"All costs shown are based on an Engineering News Record index value for Aug. 1976, of 2450. Costs were derived from three separate sources of engineering costs curves. These sources are as follows: Environmental Protection Agency; Cost-Effective Wastewater Treatment Systems; Culp, Wesner, and Culp Cost Curves; and Roy F. Weston Cost Curves. The costs presented are not detailed. They are preliminary and, although they carry an allowance of 30 per cent for engineering and contingencies, could vary by up to 10 per cent. The costs are as follows:

EPA, Capital cost $5,920,000; Operating cost, $382,000. CWC, capital cost 6,325,000; operating cost $396,000. CWC & RFW, capital cost $7,638,000. EPA & CWC, capital cost $6,234,000; operating cost $482,600.

"All of the costs shown reflect the utilization of multi-media filtration as one of the unit operations in the treatment process. It is possible, in fact likely, that this may not be required to meet strictly secondary treatment requirements. Without filtration, capital and operating costs could be reduced by $870,000 and $60,000 per year, respectively. This would result in the maximum capital cost of $6,768,000 and maximum operating cost of $422,600. These are the figures which should be utilized in any discussions regarding treatment costs. The present worth of these capital and operating costs over a 20-year life at an interest rate of 7 per cent would be $11,245,000.

"Once again, these costs are preliminary and are not detailed. It is impossible to obtain detailed costs in eight hours of engineering work. Also, the costs shown do not reflect the cost of an ocean outfall."

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RESPONSES TO COMMENTS BY
MARGARET HULLS

1. No response necessary.

2. Since it is very possible that there are no such effects, this type of contract is reasonable, particularly since regulations require adversary presentations of this sort.

3. We appreciate your comments on the realities of citizen participation at the local level, particularly since it provides more data for our comments in the text of the report.

4. We believe that the attached letter on the situation in Marblehead reinforces our conclusions.